

HACKING:

How to Create Your Own Penetration Testing Lab Using Kali Linux 2016 for Beginners

Gary Mitnick

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Table of Contents

[Introduction](#)

[Pre-Flight check List](#)

[BIOS Enable Virtualization](#)

[Virtual Box + Extensions](#)

[Building your Kali Virtual Machine](#)

[Install Kali ISO](#)

[Tweak your Kali VM](#)

[Install Guest Additions](#)

[Resources](#)

[More Course Books](#)

Introduction

This guidebook is to help you get going with the “The Complete Ethical Hacking Series for beginners” by Gary Mitnick without buying any specialized equipment for penetration testing. As an introduction to penetration testing this will be all you need to get started. As you leave the beginner stages you will probably not be using a Virtual Machine (VM) for your testing purposes. It does not matter what the operating system of your host machine is, if you can get a Virtual Box up and running the steps are all the same. The reason I suggest a Virtual Machine for beginners is that if something goes awry you won’t lose your entire system. (This is safe)

This document was done independently with no connections to anyone. The intent is to speed up the Kali installation process in a Virtual Machine.

Currently there are only 2 ways of obtaining this manuscript – through amazon and through our mailing list (for free). Regardless of how you obtained this copy I want to thank you and congratulate you for investing in yourself and your computer knowledge.

Before you begin:

Working with what you already have is fine for the course, however not for real world pen testing outside of it. Most things will work, and by the way some things just WILL NOT.

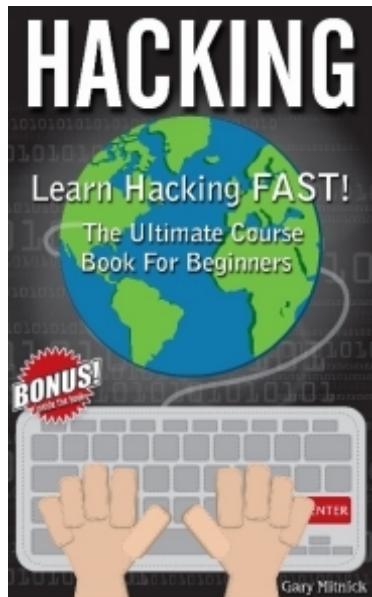
Note: Does internal wireless meet the chip requirements? **STOP Warning:** A VM will show up in Kali as an Ethernet adapter eth0. You can’t do the wireless lectures without an external USB wireless card when using a Virtual Machine. To be redundant I did not say use the internal wireless card in a Virtual Machine. To be able to do the wireless lectures in a VM, do a search for USB wireless adapters for Kali Linux. Here are a couple of sites that talk about what to use:

<http://www.blackmoreops.com/2014/01/08/recommended-usb-wireless-cards-kali-linux/>

http://www.aircrack-ng.org/doku.php?id=compatibility_drivers

<http://www.wirelessshack.org/top-kali-linux-compatible-usb-adapters-dongles-2015.html>

More Course Books



<https://www.amazon.com/dp/B013JB35IK/>



<https://www.amazon.com/dp/B01M15T2GG/>

Pre-Flight check List

Check for and update your BIOS, then Enable Virtualization in your BIOS.

Check your disk space on your current operating system. You need 15% free for your system and then you need additional space for Virtual Box and Kali.

This is important to CHECK before you begin.

Hyper-V **cannot** be used for this course. VMware can, but you should know how to use it.

Note: If you have enabled Hyper-V, you will have issues when trying to install Kali in Virtual Box and will not be able to see the 64Bit versions of Linux for Virtual Machines you can disable Hyper-V in Windows Features just uncheck anything Hyper-V and reboot your system.

Check the version of your operating system. Is it 64 Bit or 32 Bit? All your downloads should match your system. (*64-bit program is not going work on a 32-bit machines and vise-versa*)

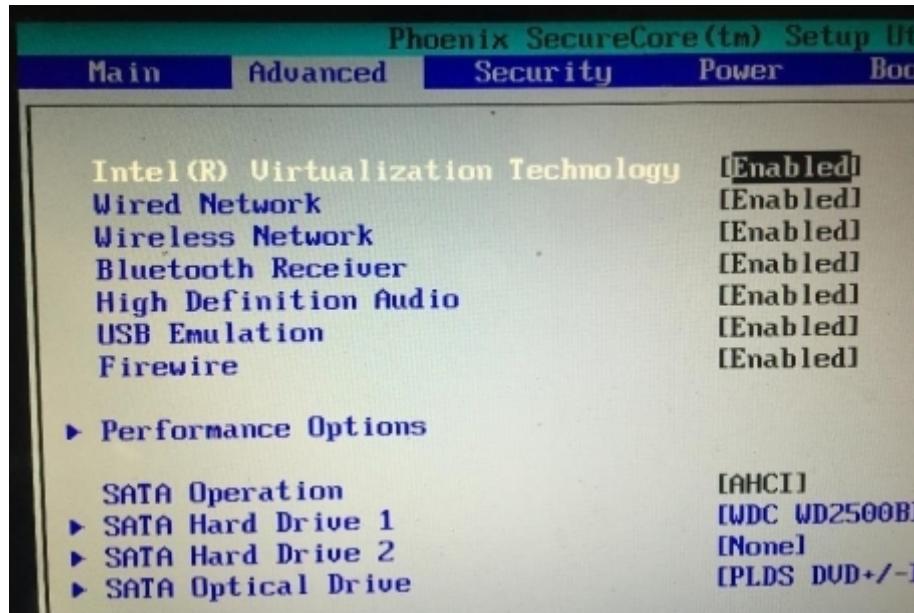
Download Virtual Box & Virtual Box extension - install both before creating your Kali Virtual Machine.

<https://www.virtualbox.org/wiki/Downloads>

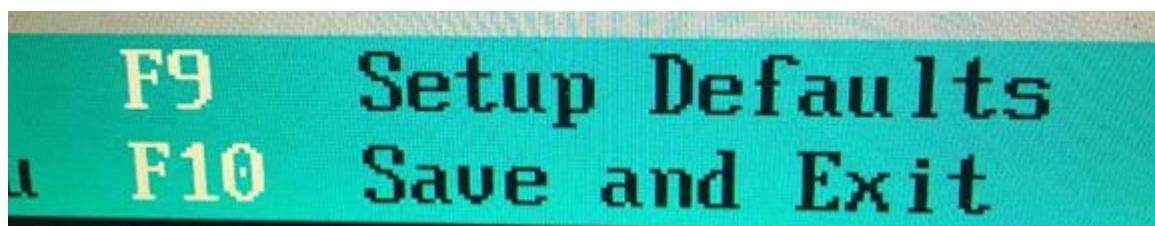
Download the Kali 2016 ISO from <https://www.kali.org/downloads/> be sure you have a complete download (some security suites will block this) Before attaching your USB external Wireless card, be sure to get Kali up and working with Virtual Box extensions, guest additions and updates installed.

BIOS Enable Virtualization

Enable Virtualization in the BIOS (if you do not you will not be able to see 64-bit editions and the installation may fail). Enter the BIOS during startup of your physical system. Each system is different so **the key to press may be different for your system**. I used a Dell laptop so I had to hit F2 on boot up to get into my BIOS. (google search for your system)



In this case Virtualization was under the Advanced Tab, you want to make sure that it is enabled (**MOST of the trouble with setting up a VM have been caused by skipping or not doing this part**) Once you have enabled Virtualization you want to save your changes and exit the BIOS. In some systems, it may not say Virtualization but instead say “VT-x”



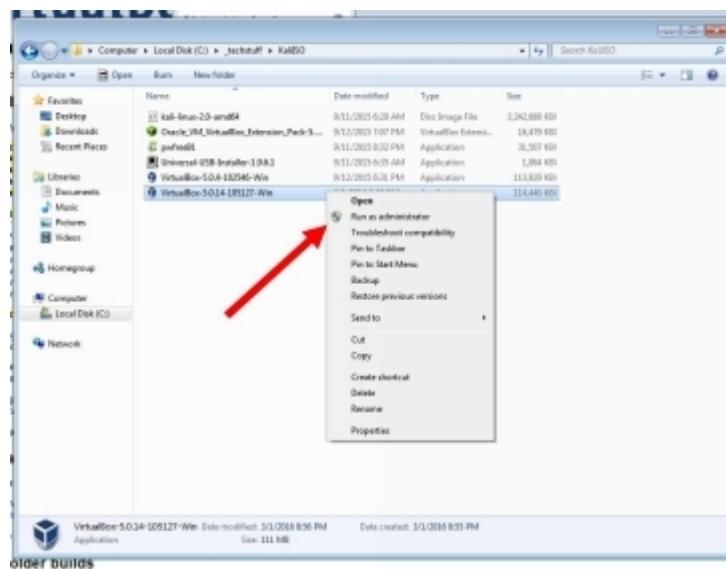
Some systems may need to be powered down completely then restarted for this to take effect. You can check with your system manufacturer or google how to get into your BIOS. You can read about what the BIOS is at <https://en.wikipedia.org/wiki/BIOS>

Virtual Box + Extensions

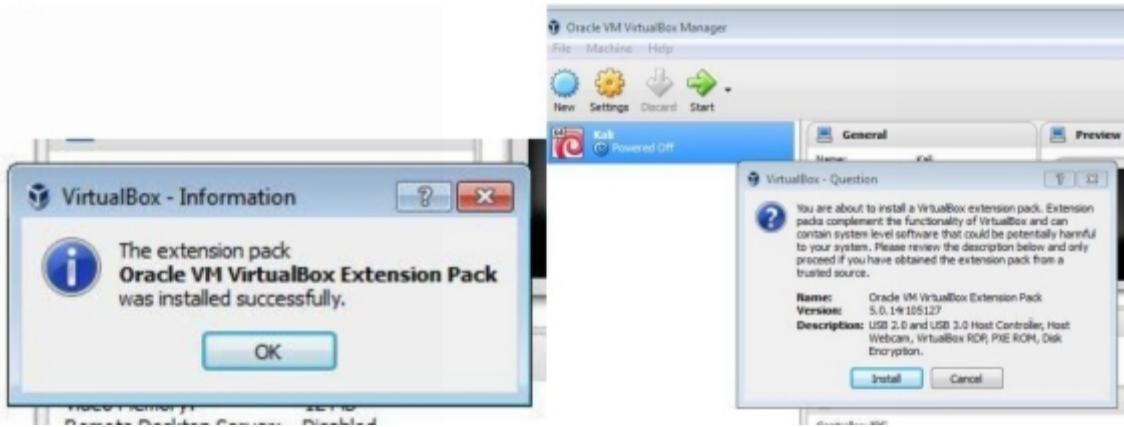
Install the Virtual Box and then install the Virtual Box Extensions. These are basic Windows programs just take the defaults for both Virtual Box & Virtual Box Extensions. If your host system is OS X or Linux, you need to do the same installs but with the Virtual Box editions that match your system. The steps for creating a Virtual Machine are the same.

To avoid any problems when in Windows choose right click & Run as Administrator option (even if you have administrative rights). Be sure you have the version that matches your system OS if you are not in Windows. All downloads can be found at <https://www.virtualbox.org/wiki/Downloads>

You also need to download Kali Linux 2016 ISO file from <https://www.kali.org/downloads/> pick the version that matches your system. Install based on your operating system. If you have a 64-bit system, then download the 64-bit versions & 32 bit just use the 32-bit options. If you do not have virtualization available only use the 32-bit downloads for your install.

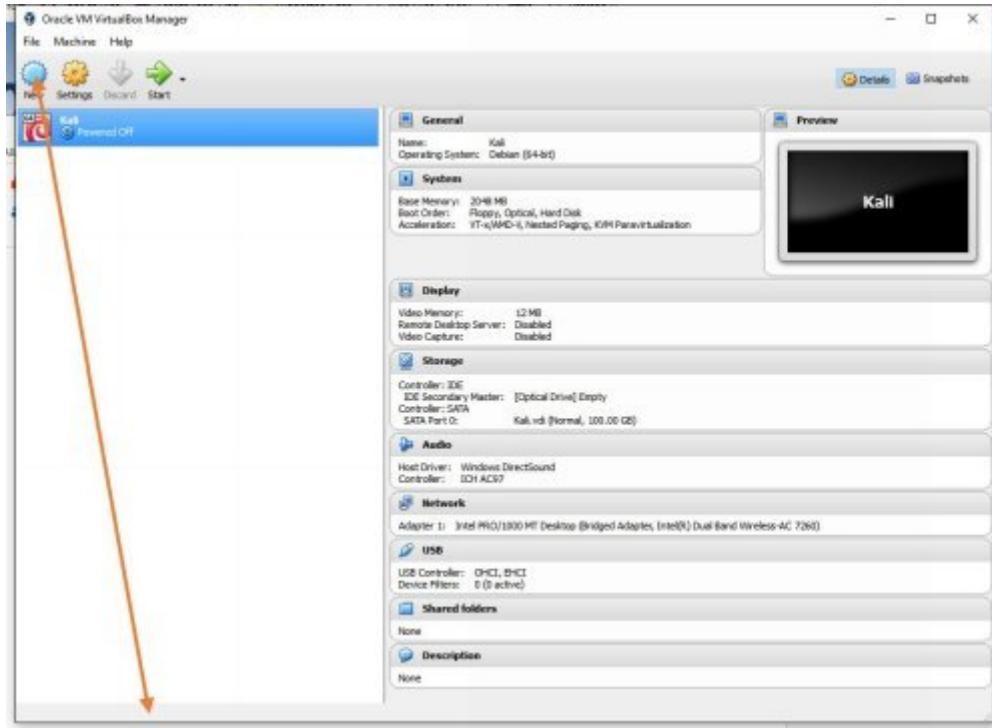


In Windows Run as administrator when finished close and install VBox xtensions.

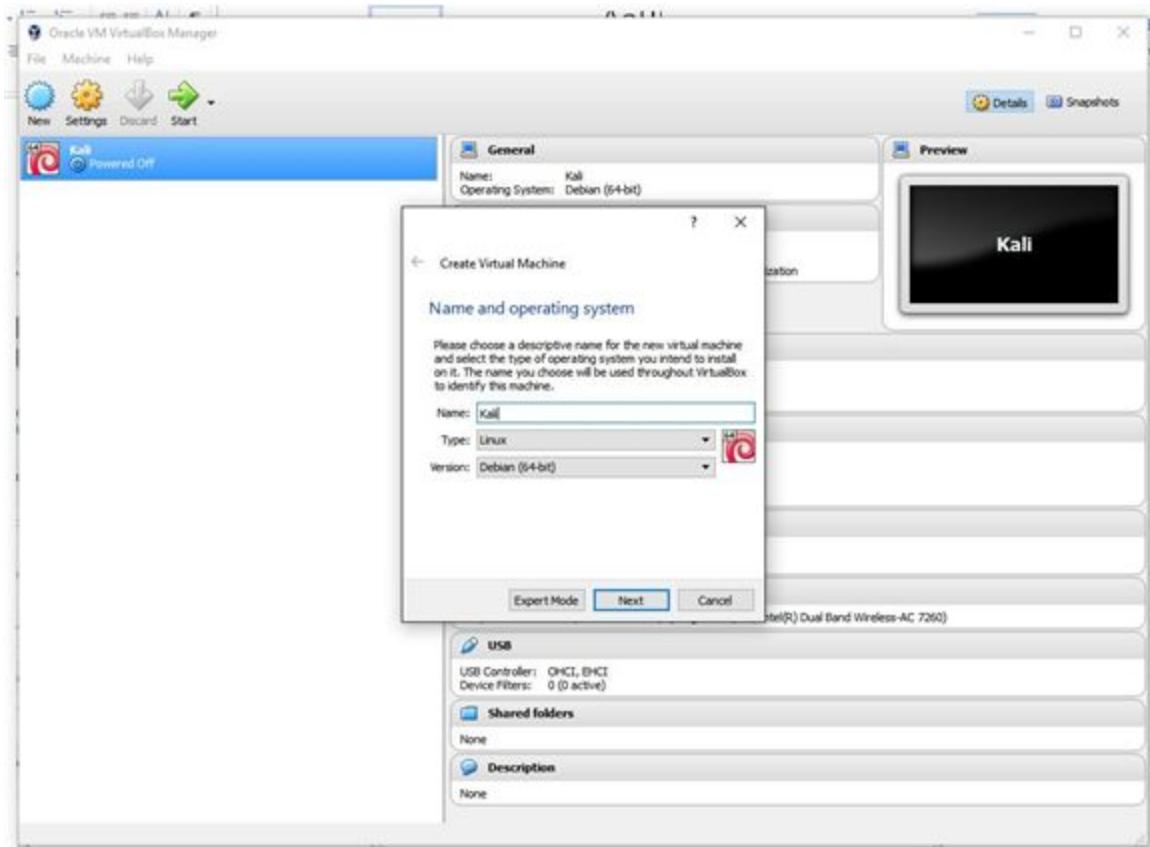


Building your Kali Virtual Machine

Start Virtual Box (I already have Kali installed here in another VM that's why you see that icon there we will make a new VM here)

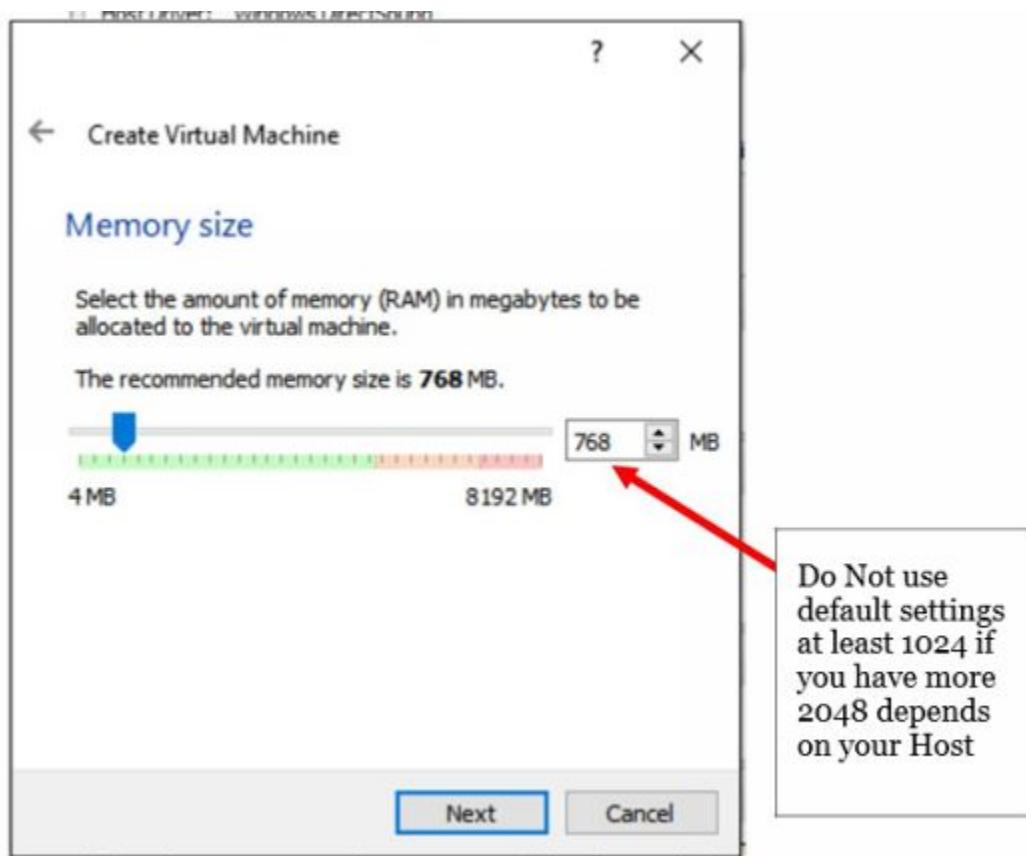


Click on “New”. This Starts the Creation of a new VM.

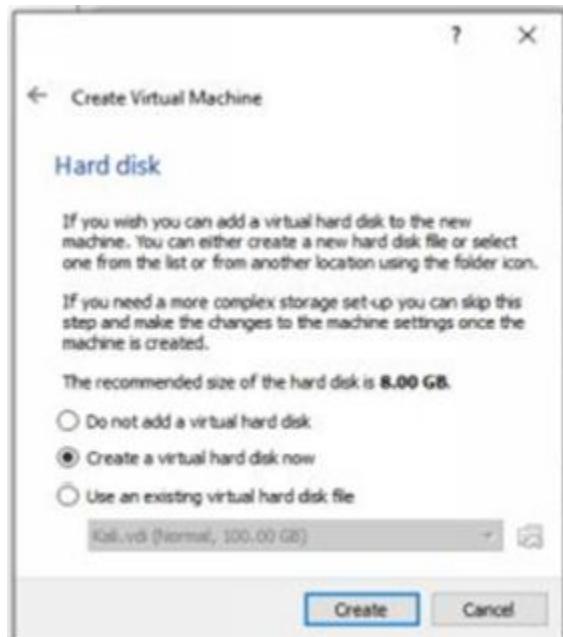


Give it a name like “Kali” or whatever you want it to be. Then click the drop-down menu by “type” and choose “Linux”

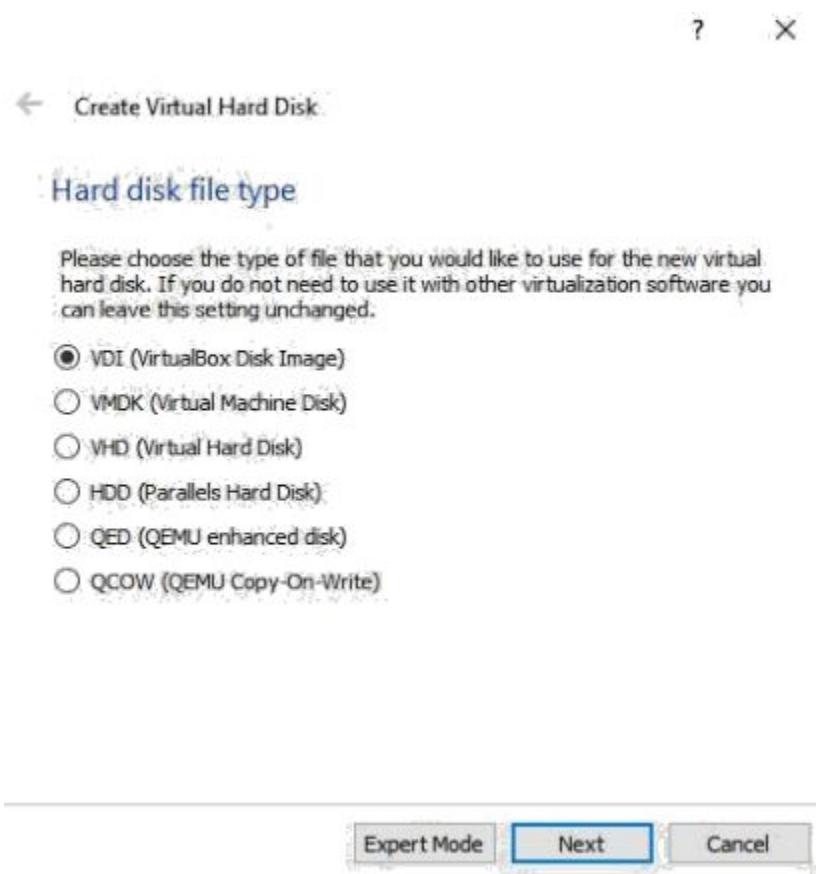
Then choose the “Debian 64bit” (if you have a 64-bit system, and virtualization is on in the BIOS (if you have 32bit system then Debian 32bit option) PRESS next



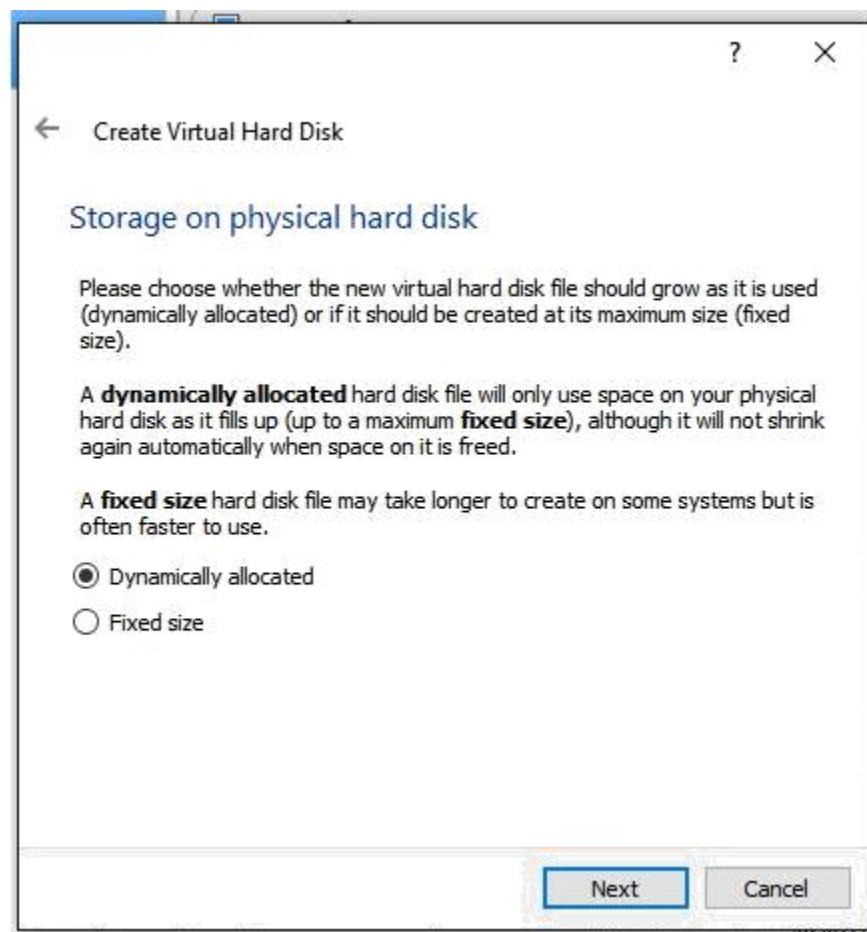
Set your memory size, my machine has **8gig** available so I am giving the **VM 2 gig**. You can type in how much you want to give the VM. I chose 2048. This can be changed later if needed. (Don't give it too little or it will be slow and too much your host system will be slow)



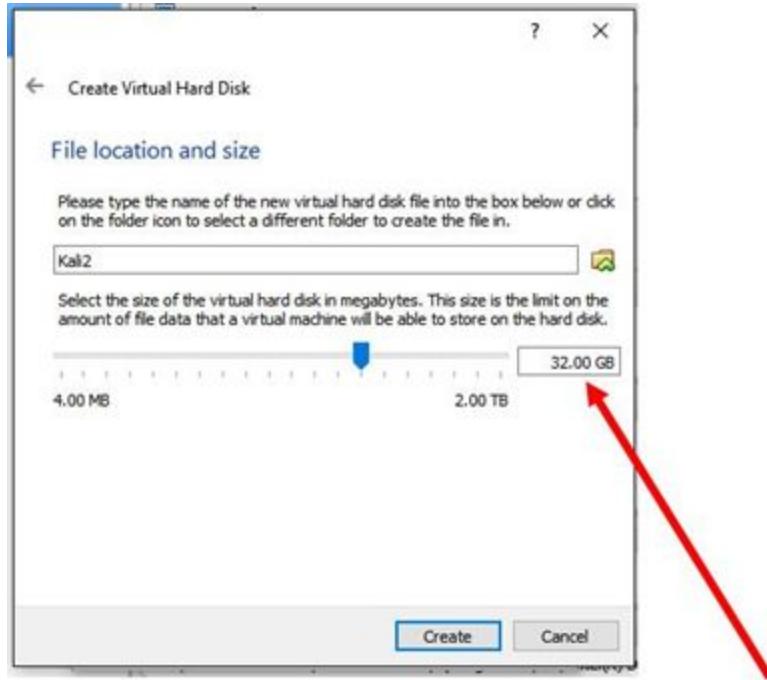
Next we will Create a virtual hard disk for Kali. I used 32gig for this example. You can give it more space if you have it. (again check the free space on your actual hard drive)



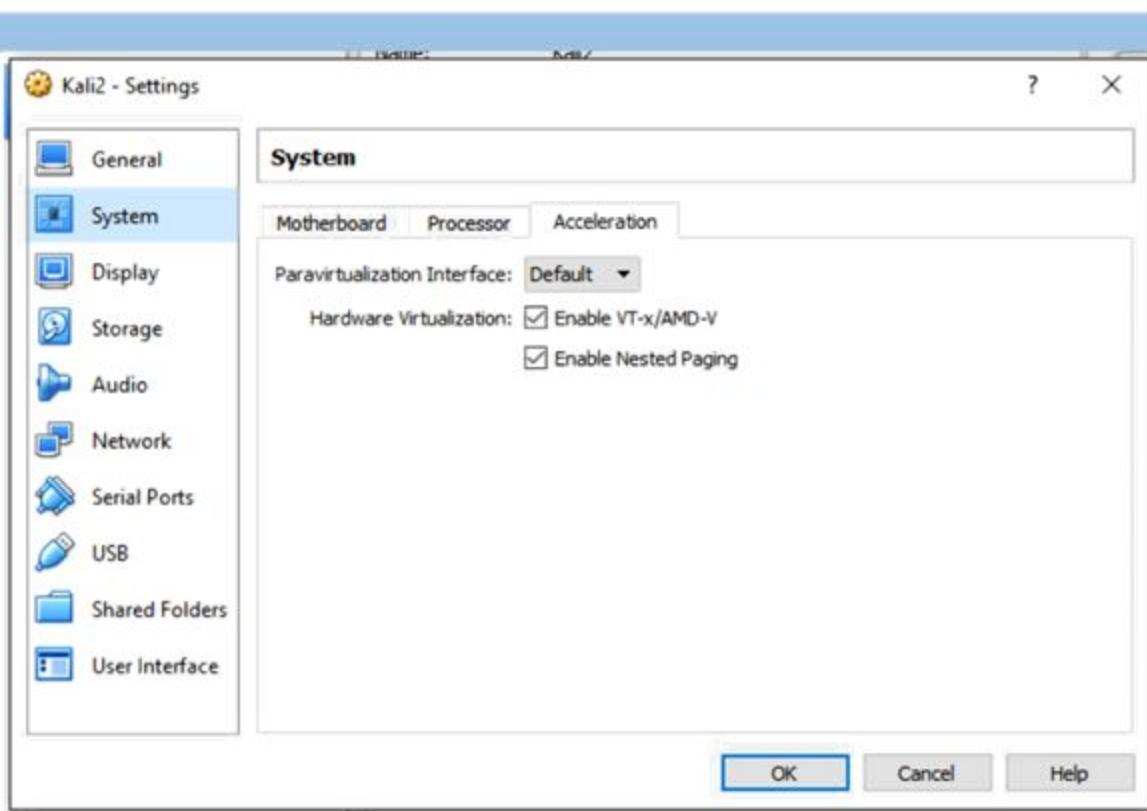
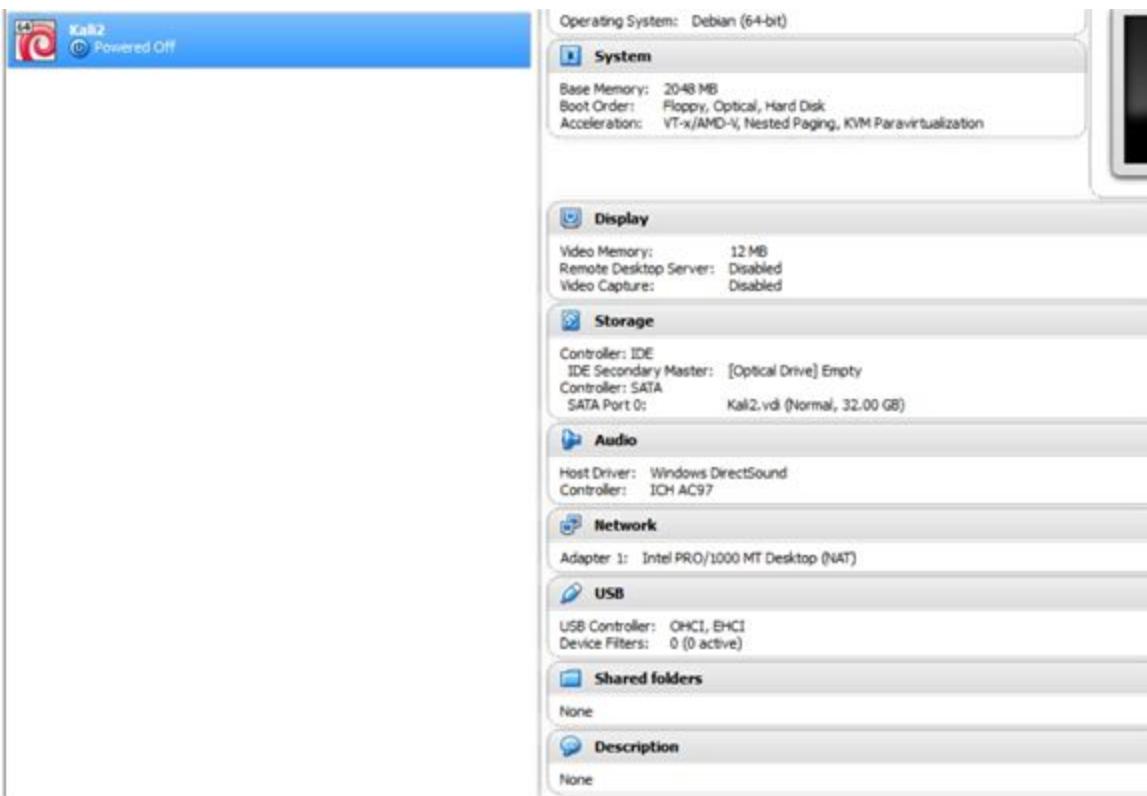
Unless you have other plans take the default and press “Next”.



Take the default press “Next”.

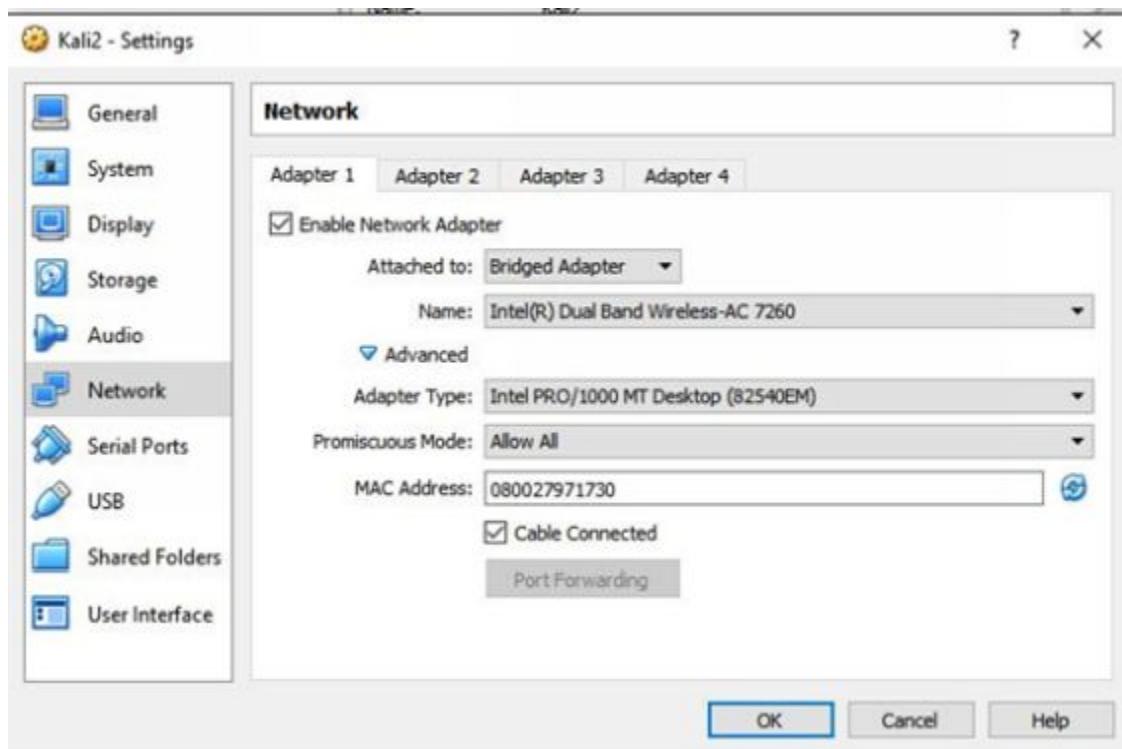


I set this to **32 gig**. If you have space to spare, try **64 gig** and click create (Do Not take default of 8 Gig change it)



Under System, under the Acceleration tab, all of the options should be checked (*These might be grayed out if you did not turn on virtualization on in your BIOS*)

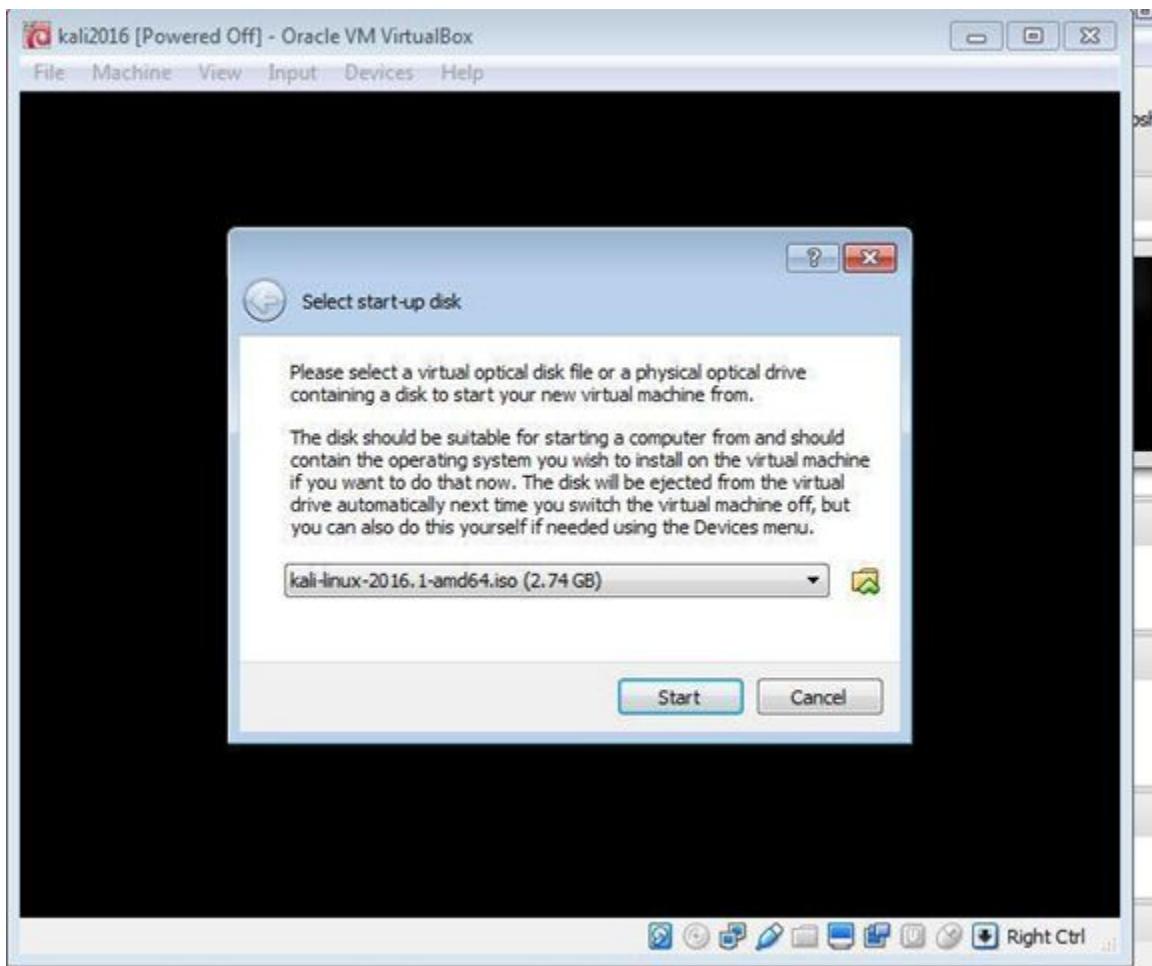
Bridge your adapter (the name of your actual adapter may be different) you want the adapter that your host system is currently getting an i.p address and connecting to the internet.



Make your network setting look exactly like this, but with the adapter you have and **allow all** in the advanced section. Your VM is now prepped, press OK, go to the top of VBox and press START.

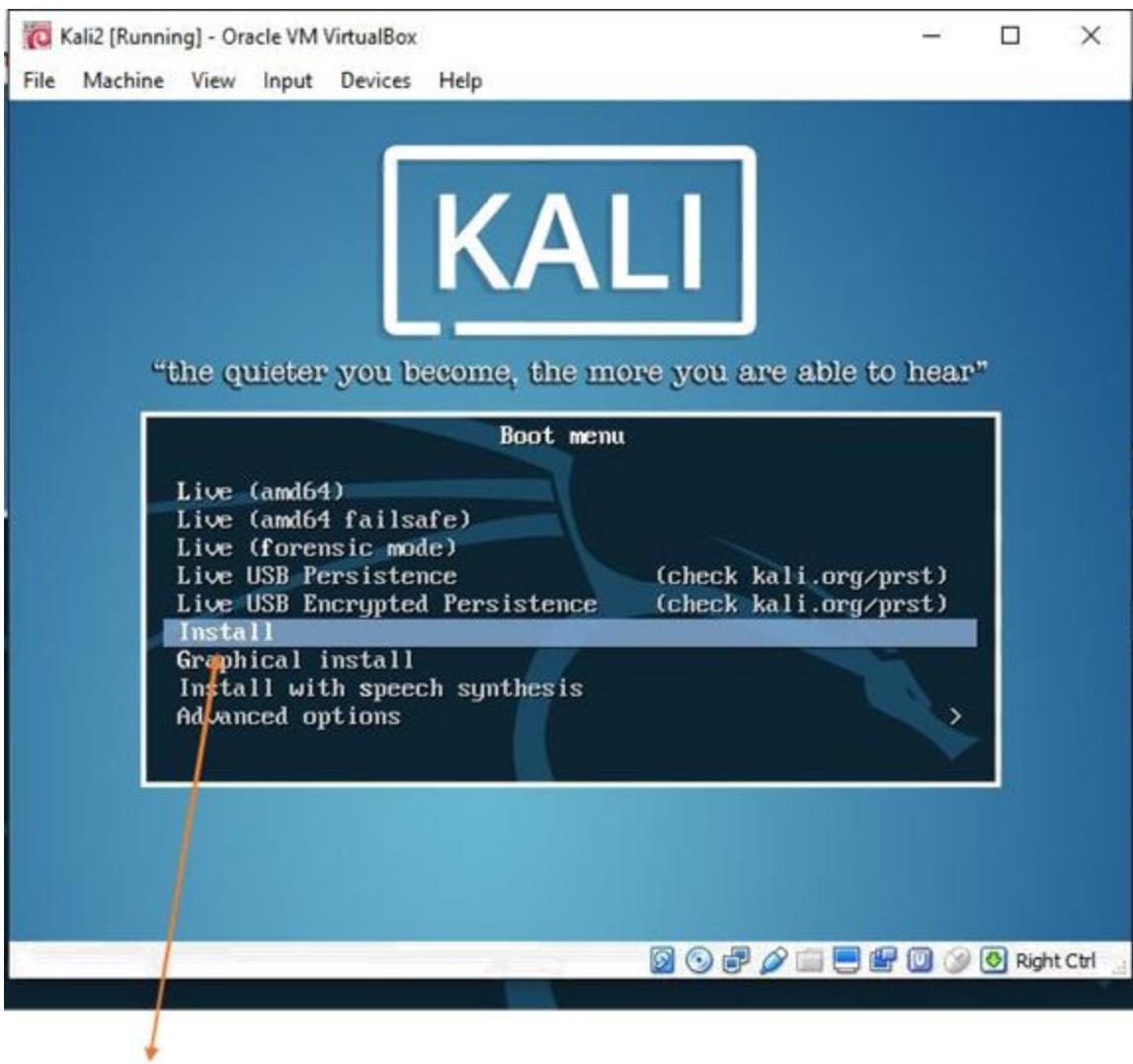


Install Kali ISO

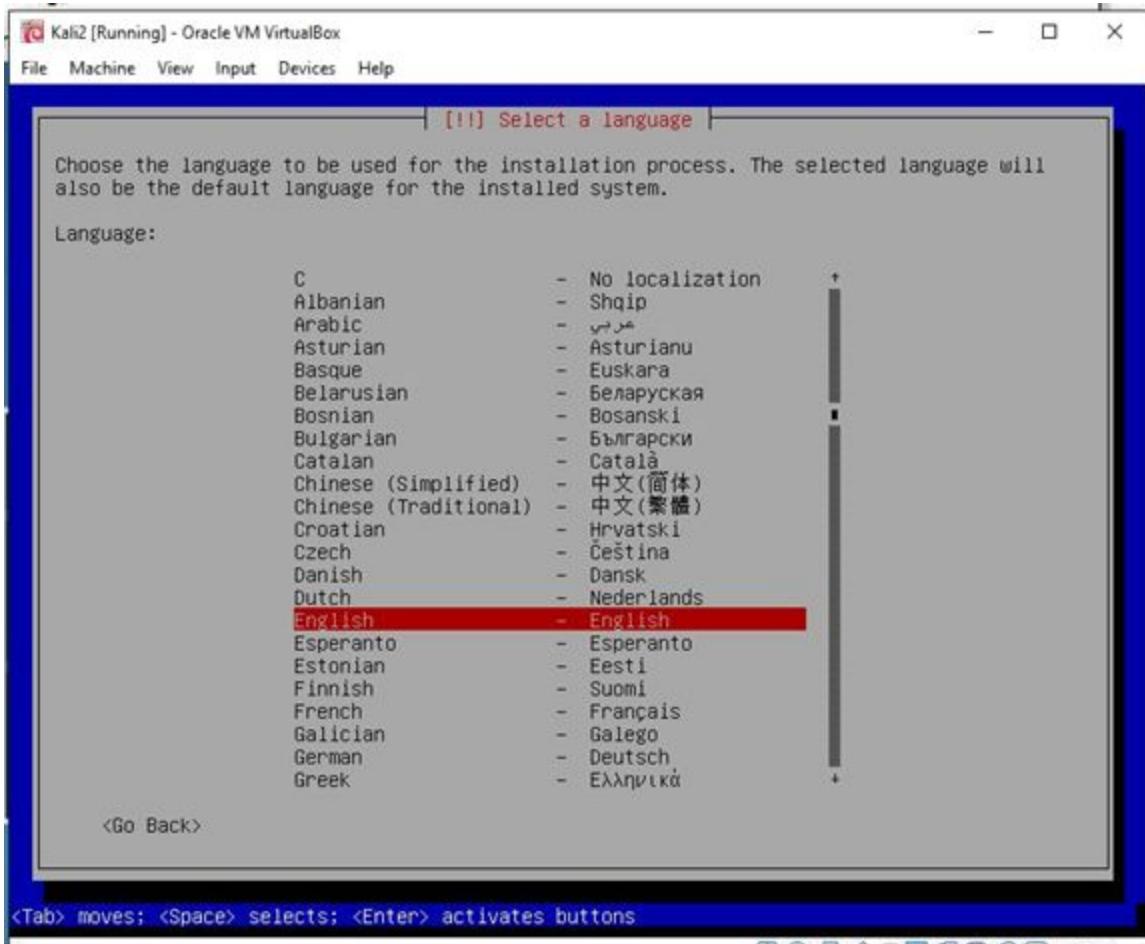


 [kali-linux-2016.1-amd64](#) Browse to the 2016 iso

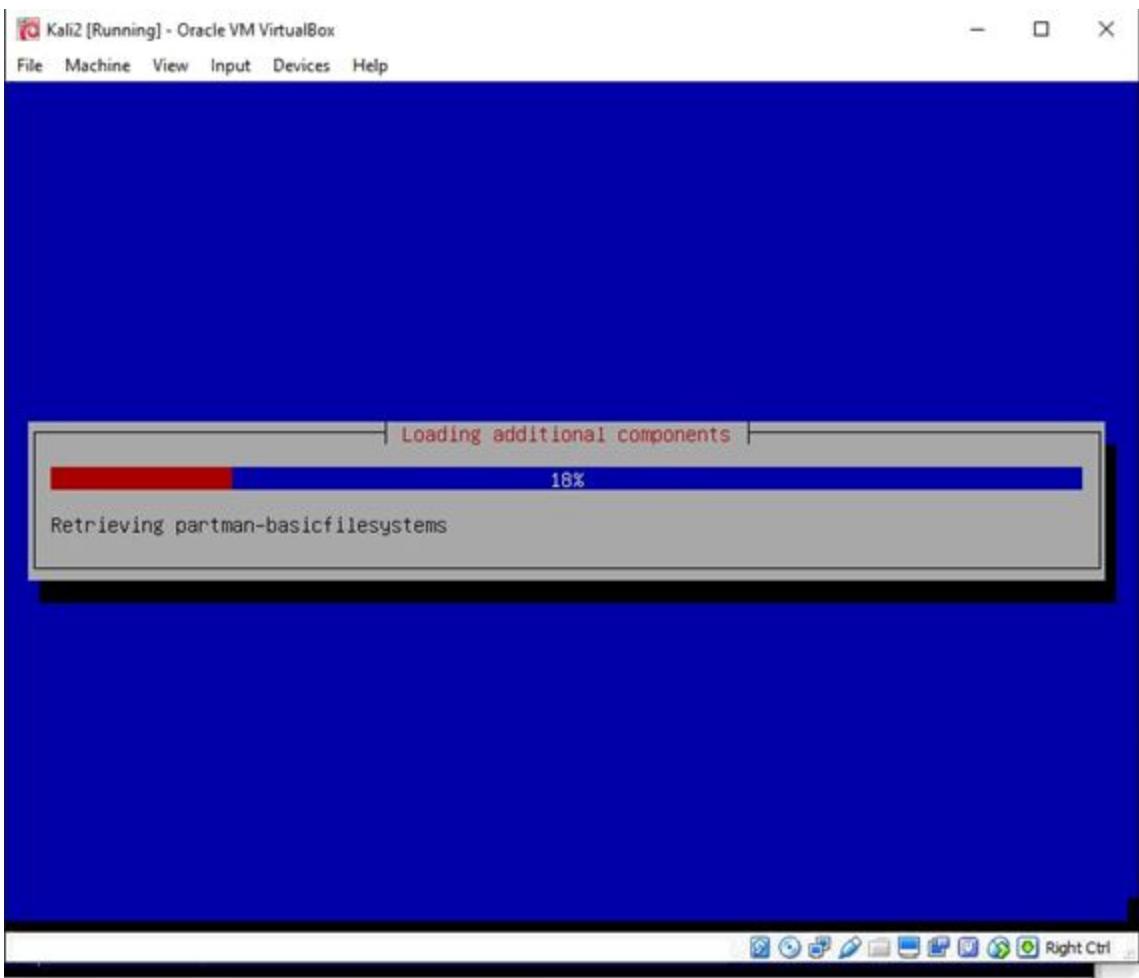
“Select start-up disk” will pop up, browse to the Kali ISO image you downloaded. Use the folder icon to browse to it if you do not see it (hopefully you remember where you put it) press **Start**.



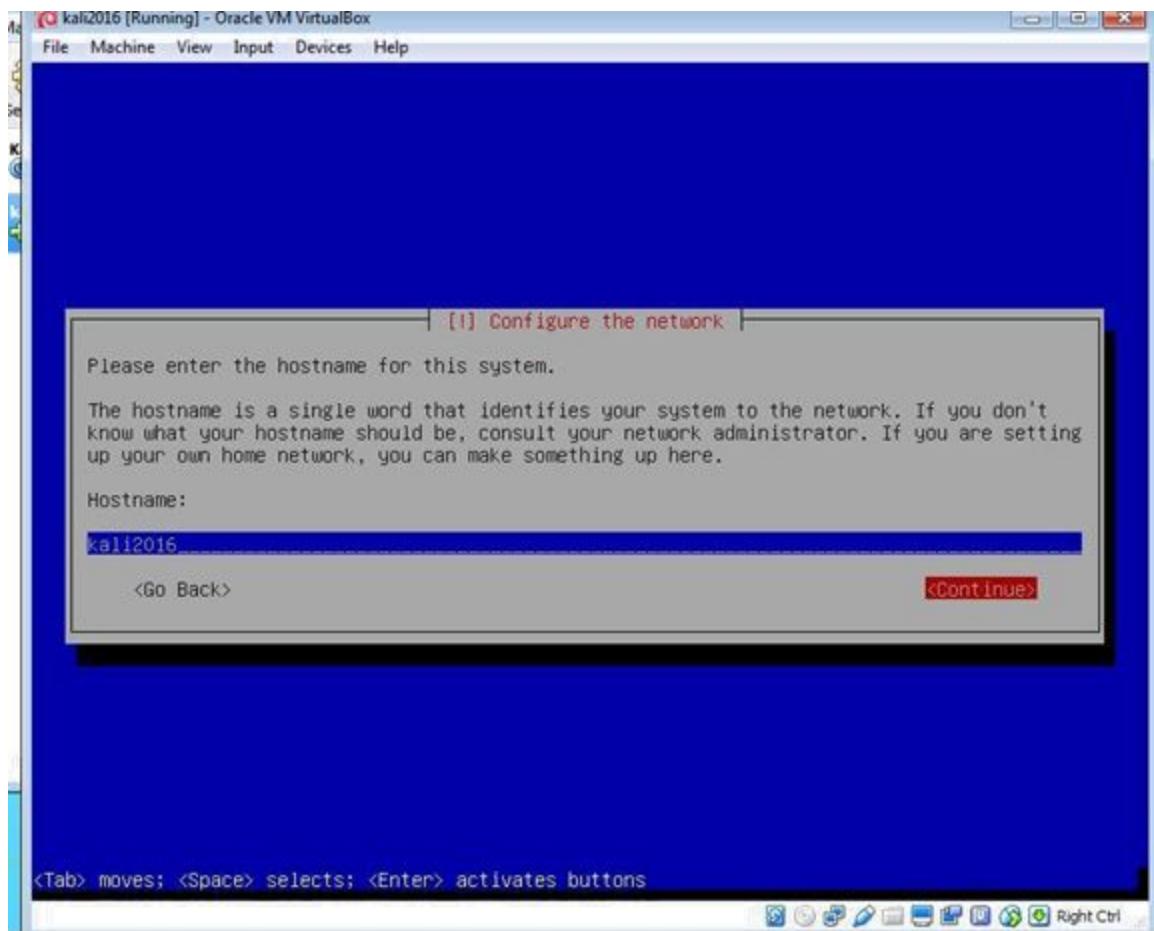
Use the Install option and you are on your way.



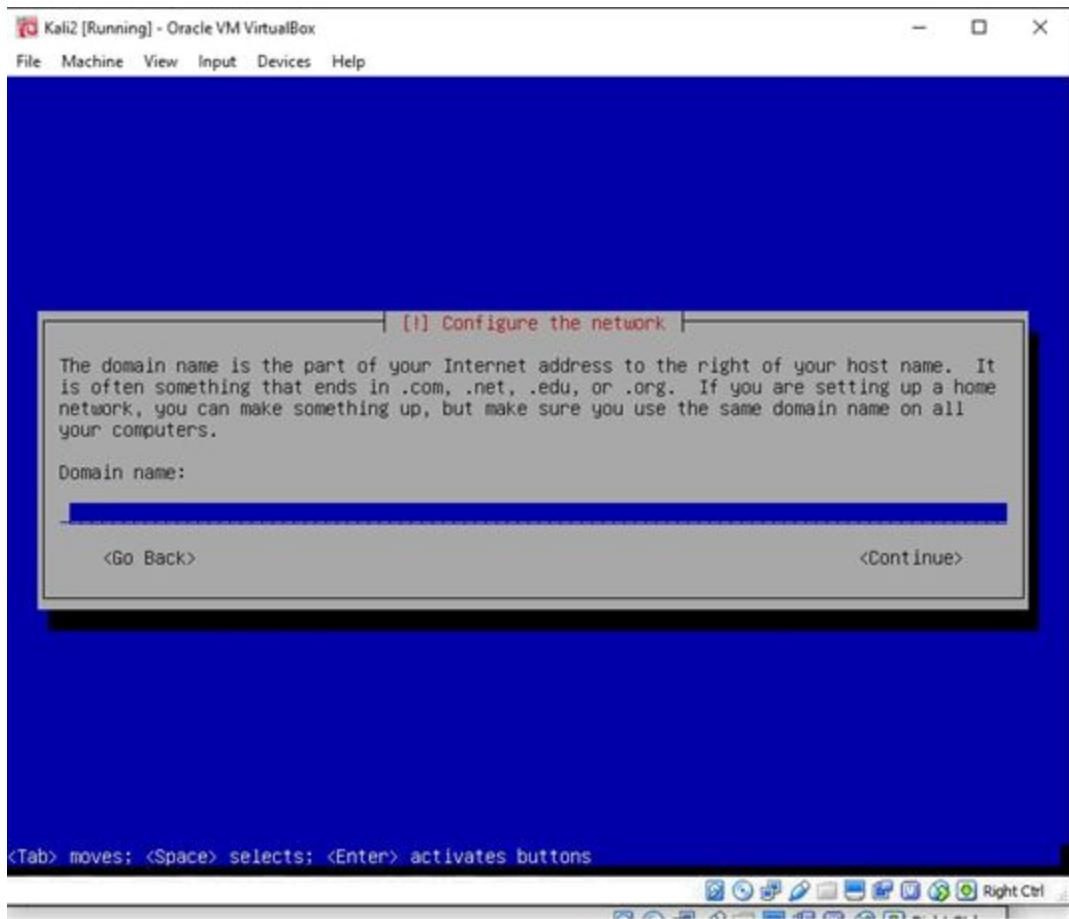
Select your language and country. I picked American English (*select the defaults on the remainder of the set-up screens for your country etc.*) (*incorrect keyboard and you may not be able to log in after*)



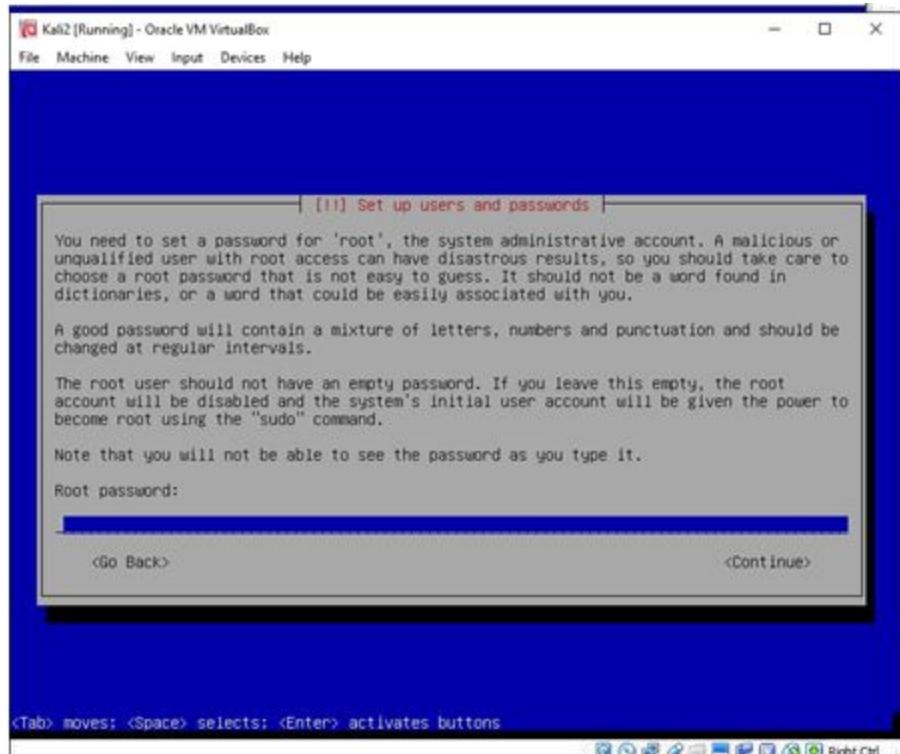
The install should begin. This can take time. (*If you did not allow enough disk space, this operation may fail*)



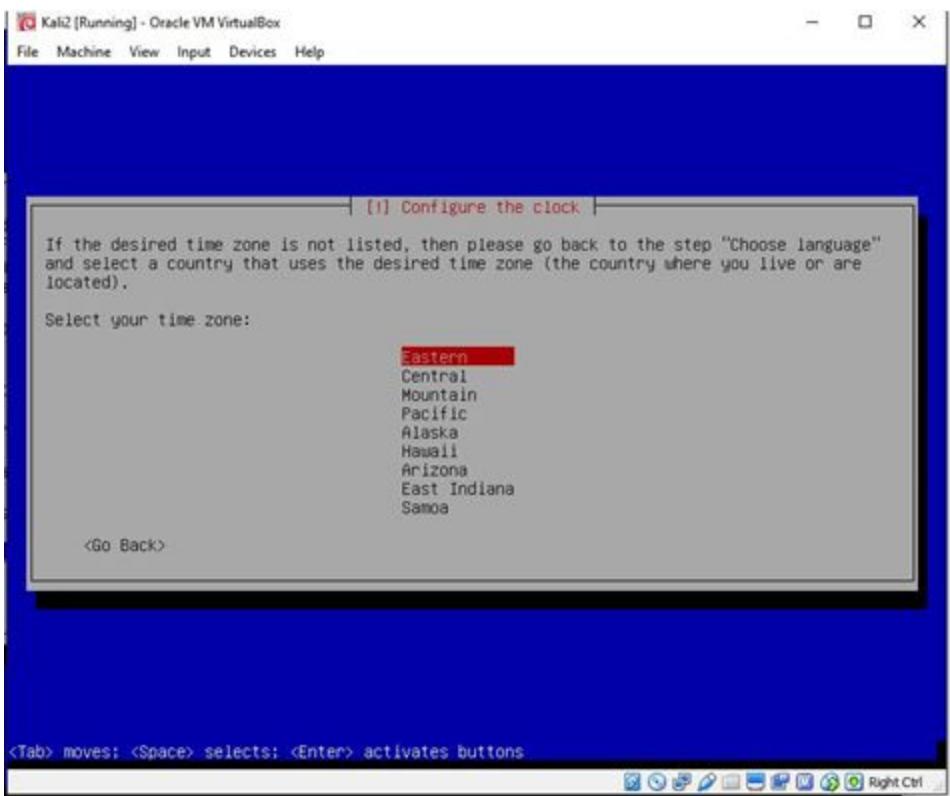
Here you can call it what you want but for most of the screens, you can take the default and just press continue (*enter key*)

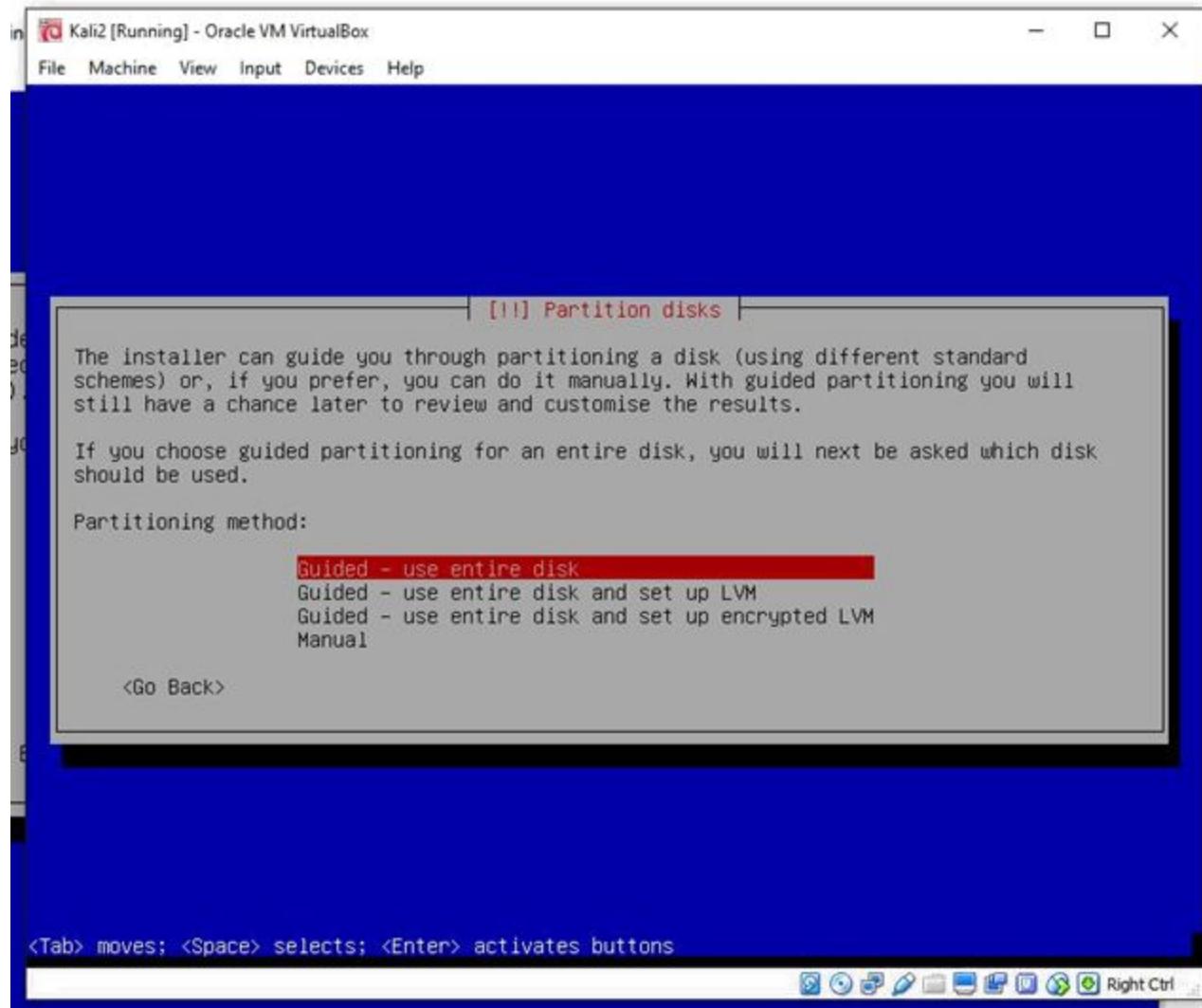


A domain name is not required, just press continue.

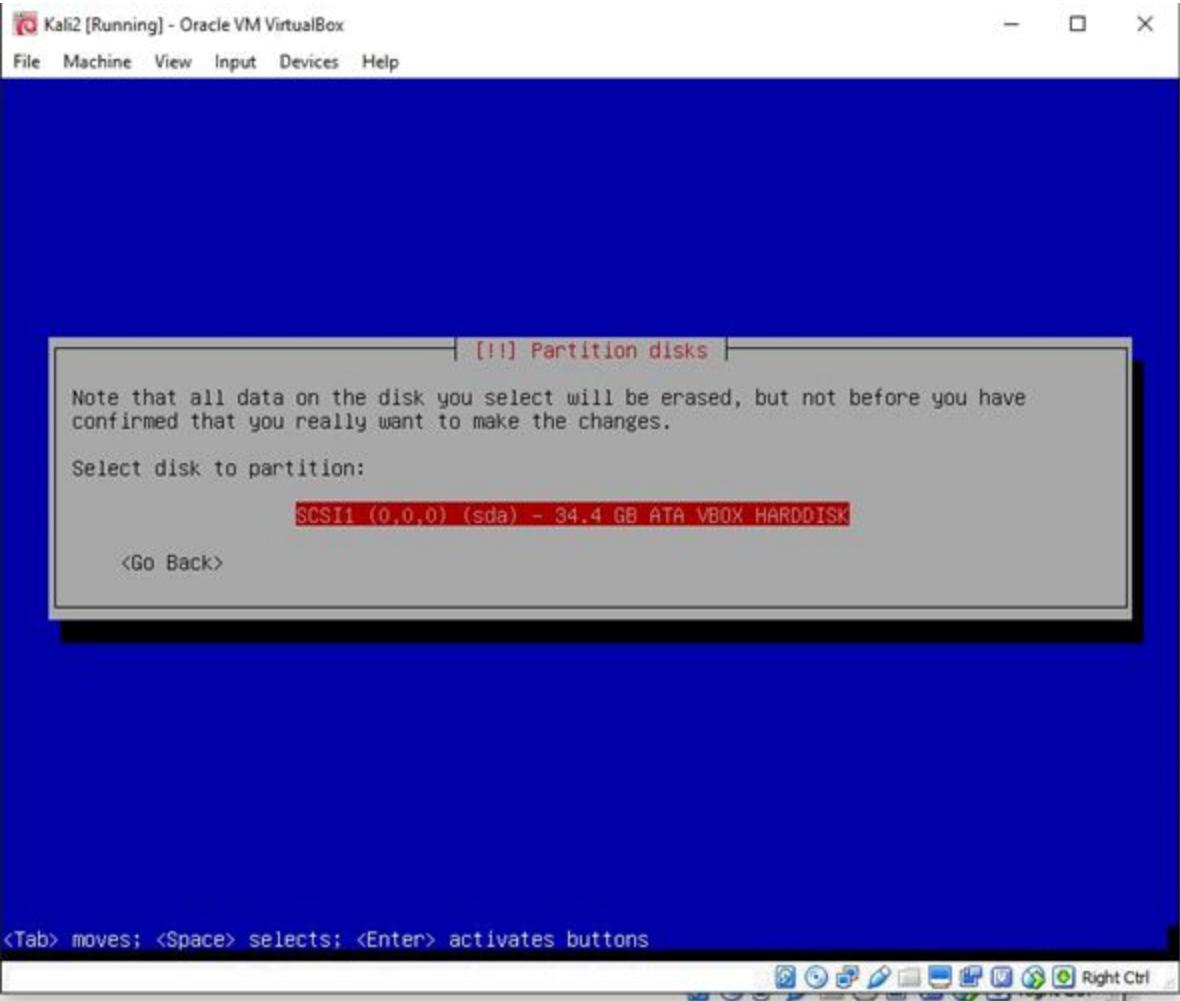


Set your password, don't forget it. It is case sensitive, and you will need to verify it on the next screen (important you have the right language already set or you may get in later) Set your time zone (when you boot into Kali make sure your time zone and time are correct), this can prevent some programs from loading correctly like the Tor browser.

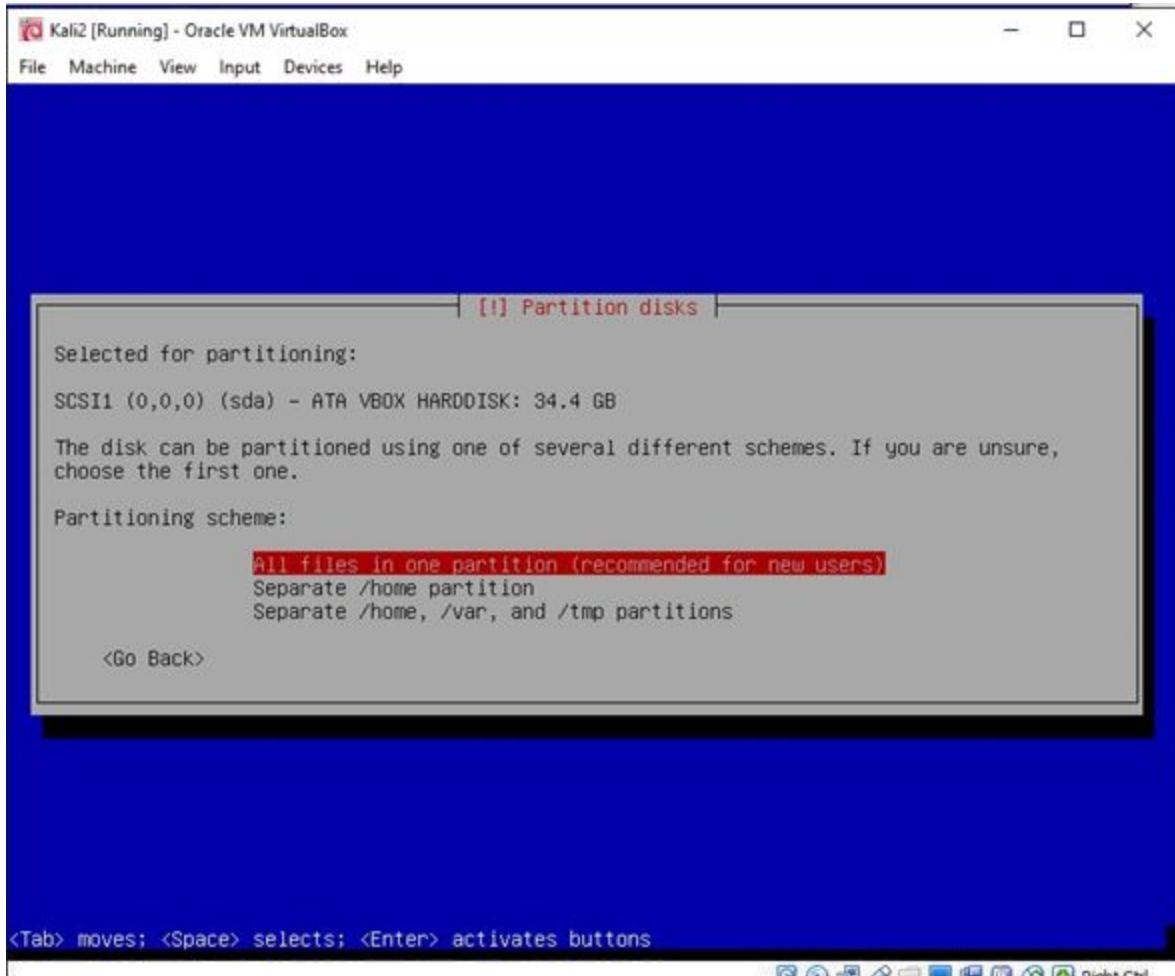




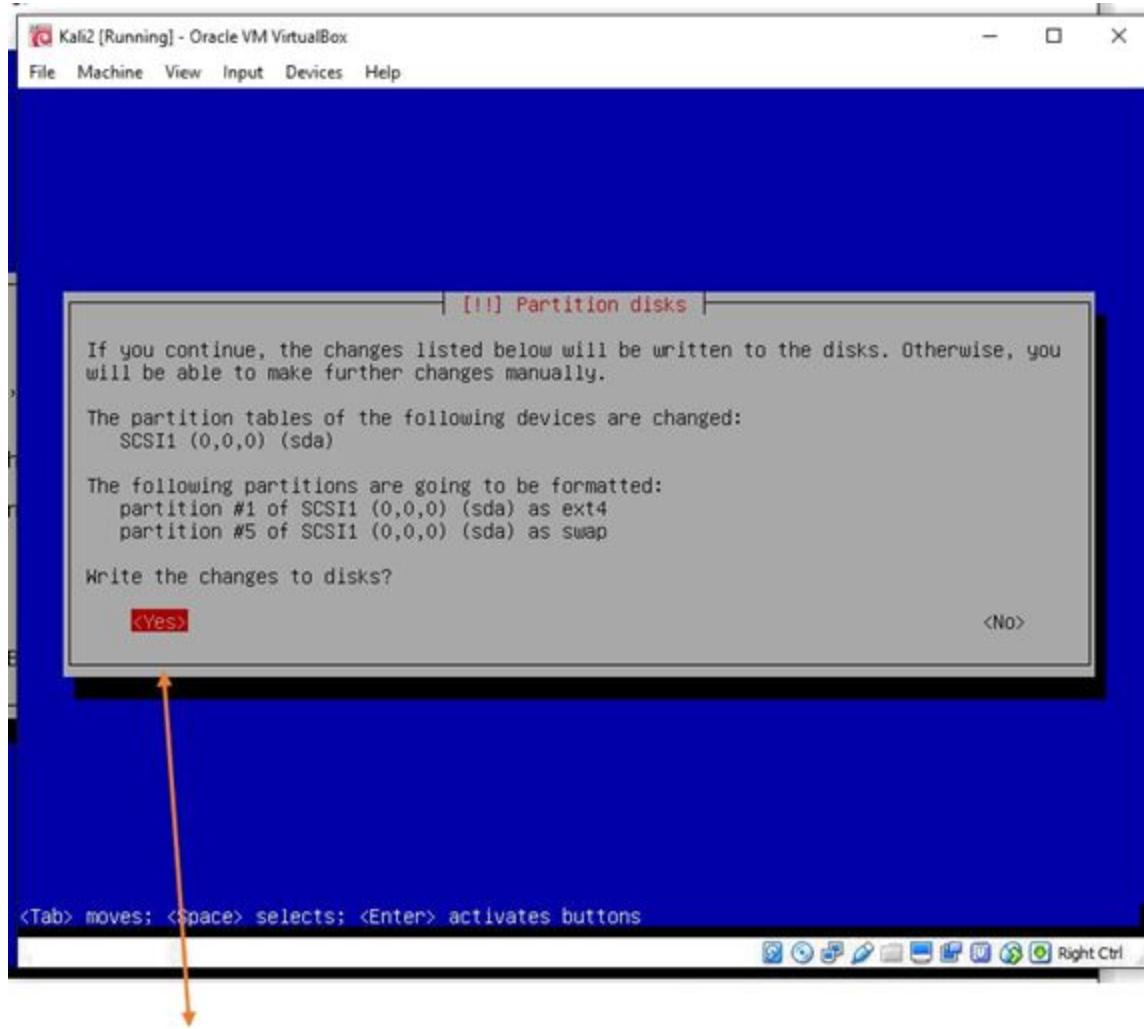
Select the default for this.



Press enter.

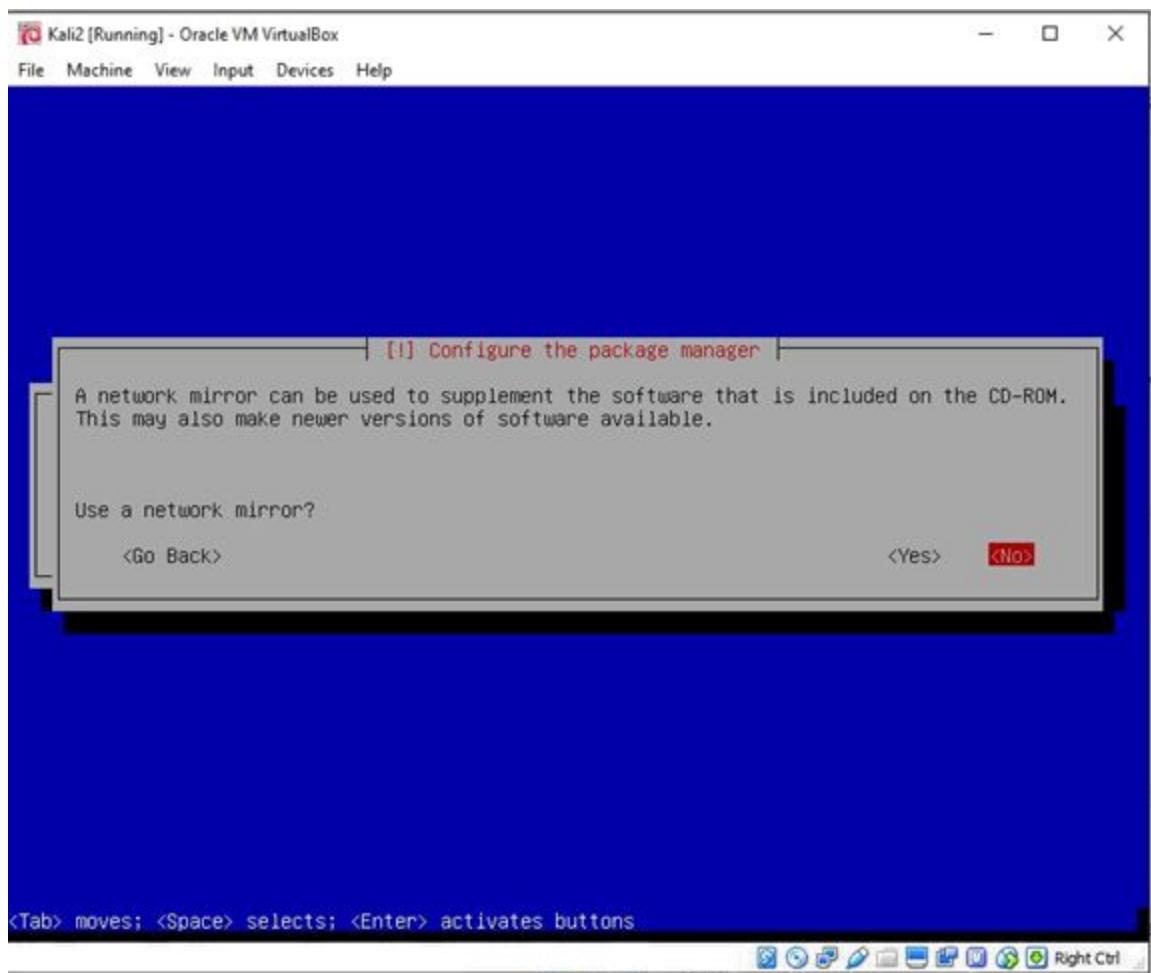


Keep selecting the defaults until you get to “Network Mirror”.

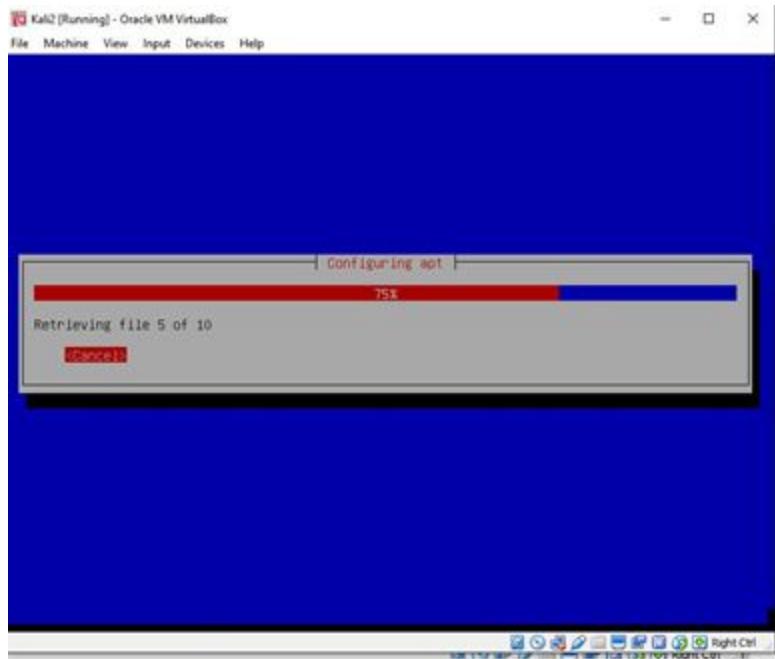


Tab over to “Yes” Press enter

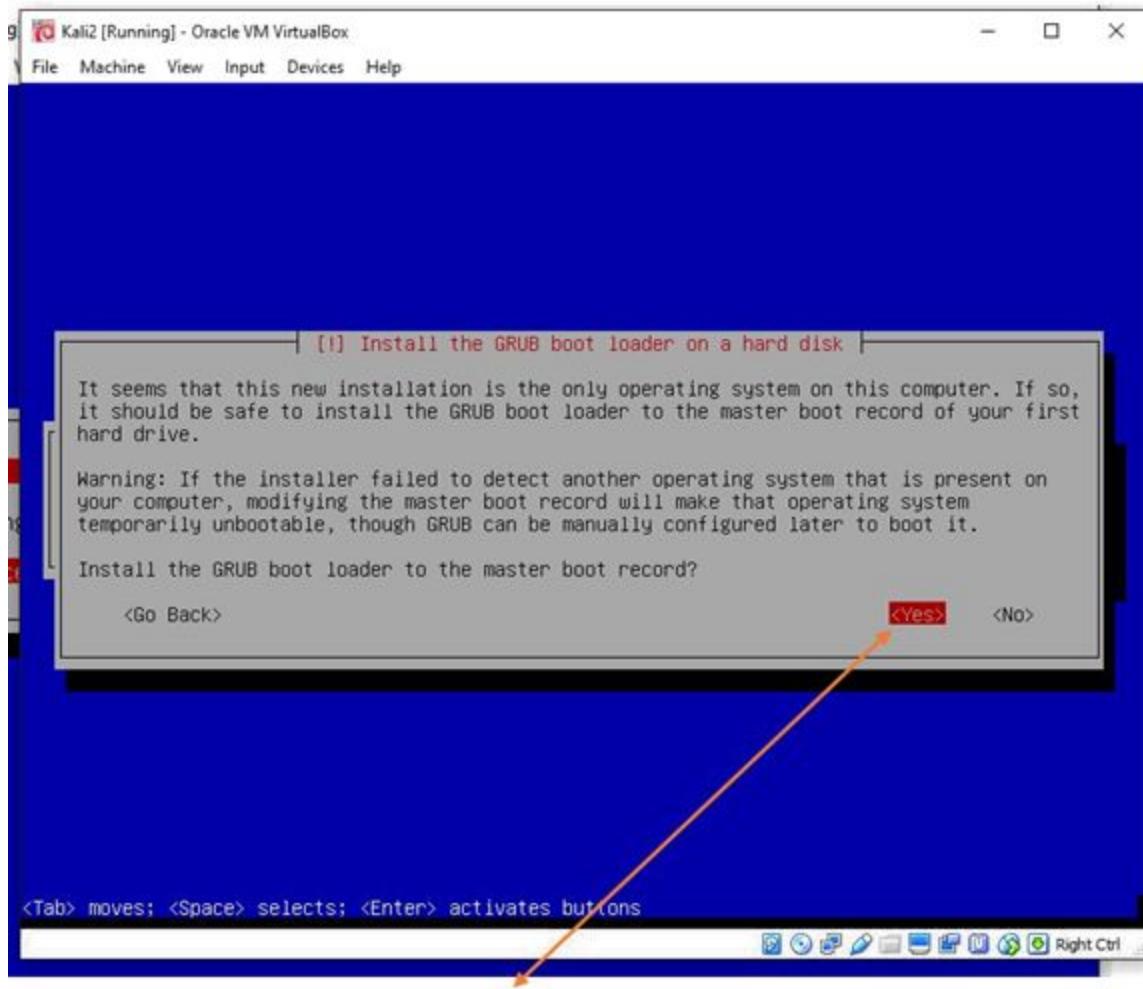
The install will begin and will take a while, be patient.



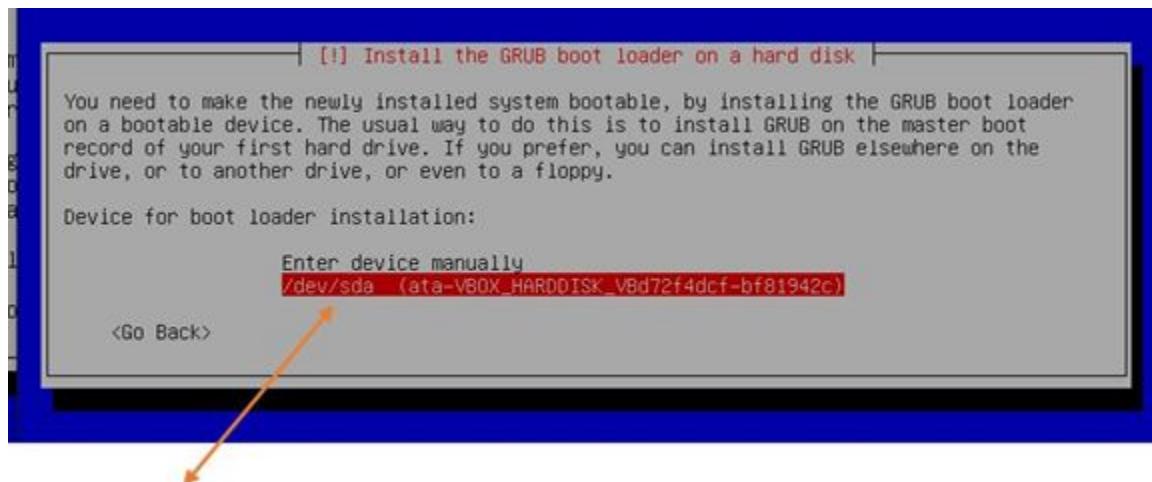
When it gets close to the end, it will prompt about a network mirror select “No” for this.



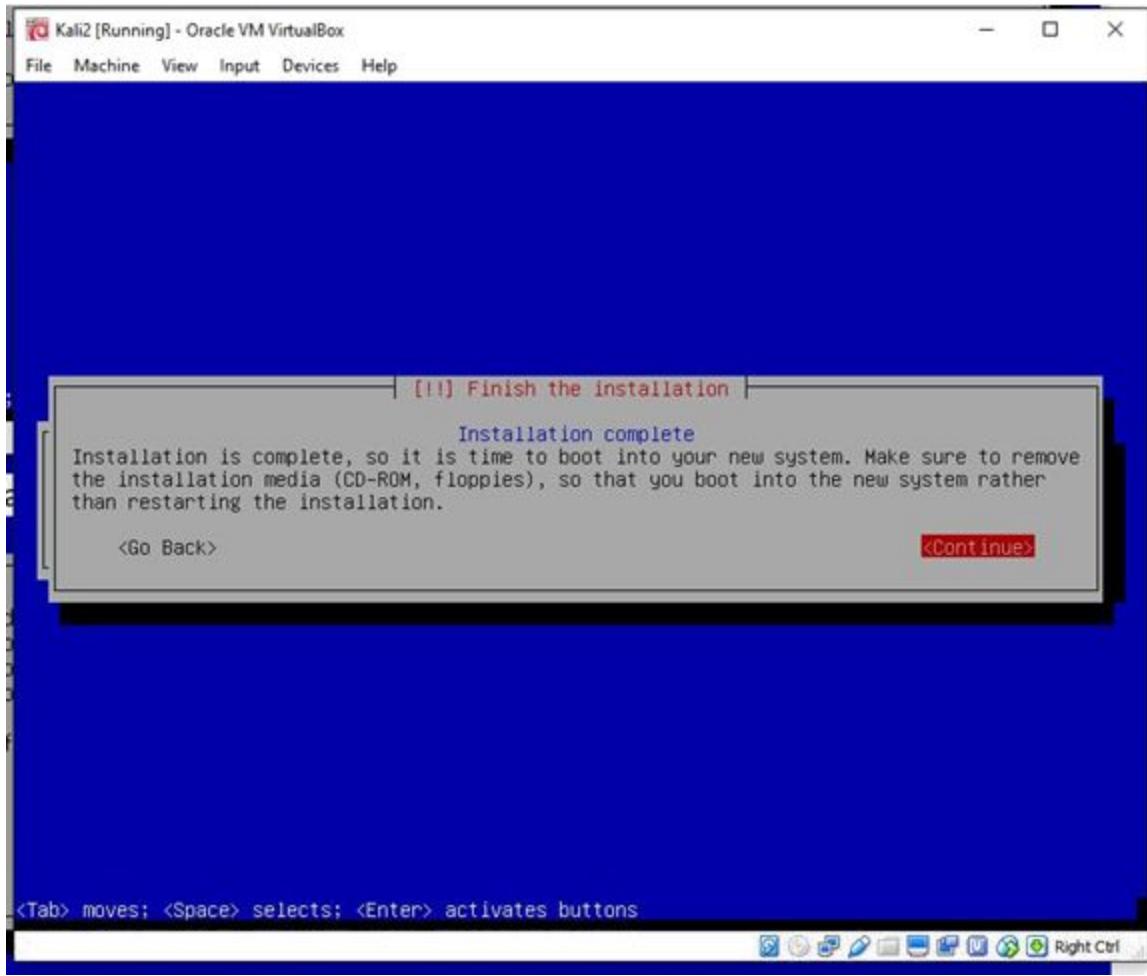
The installation will continue.



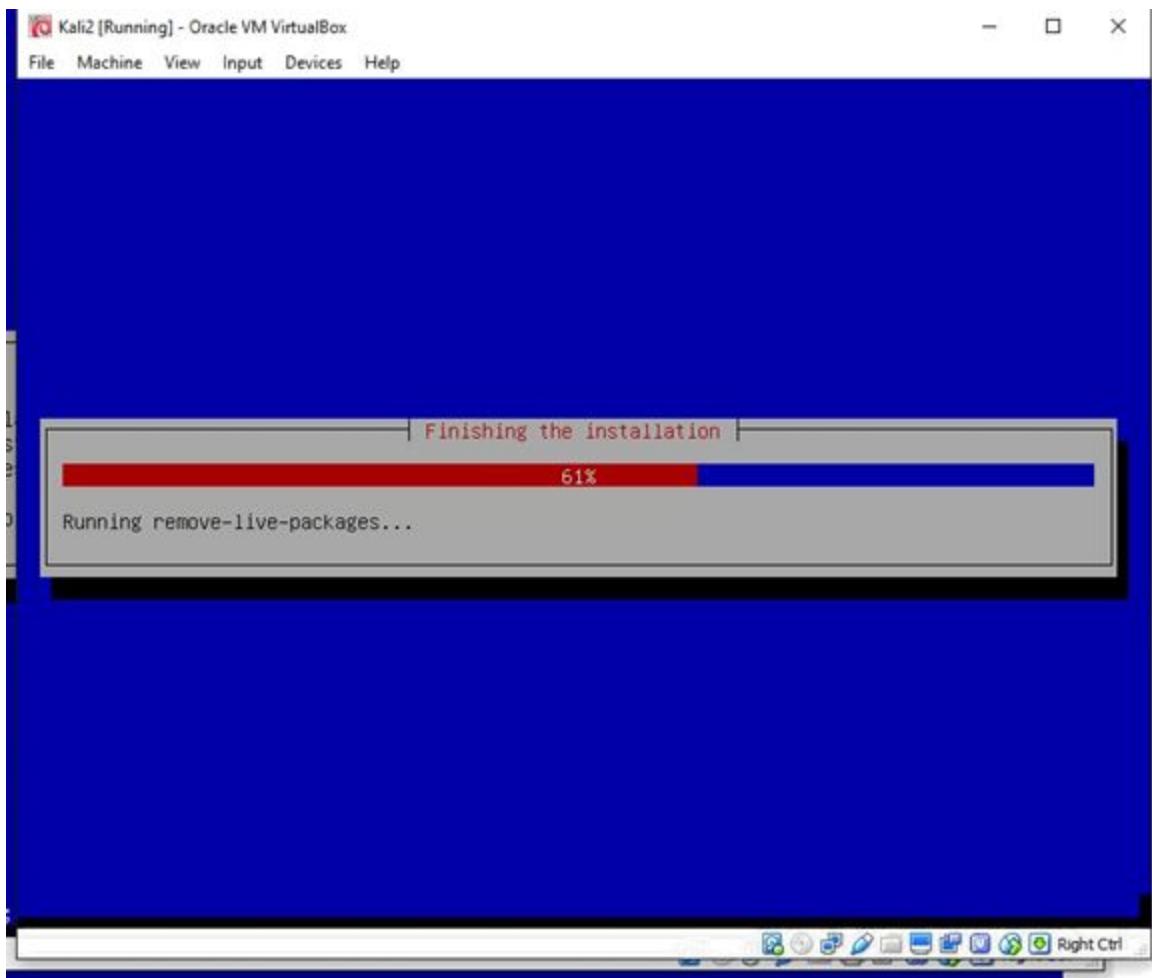
You are in a VM do not panic, press “YES”.



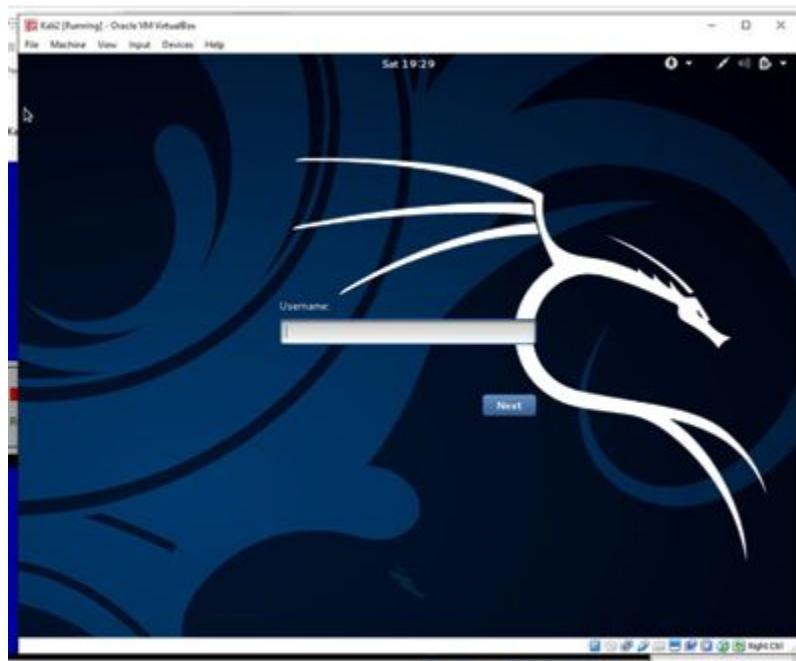
It is a VM select the second option, and the install will continue. This does not touch your physical hard drive it is going to go on the virtual hard drive you created.



You are almost there.



Almost done.



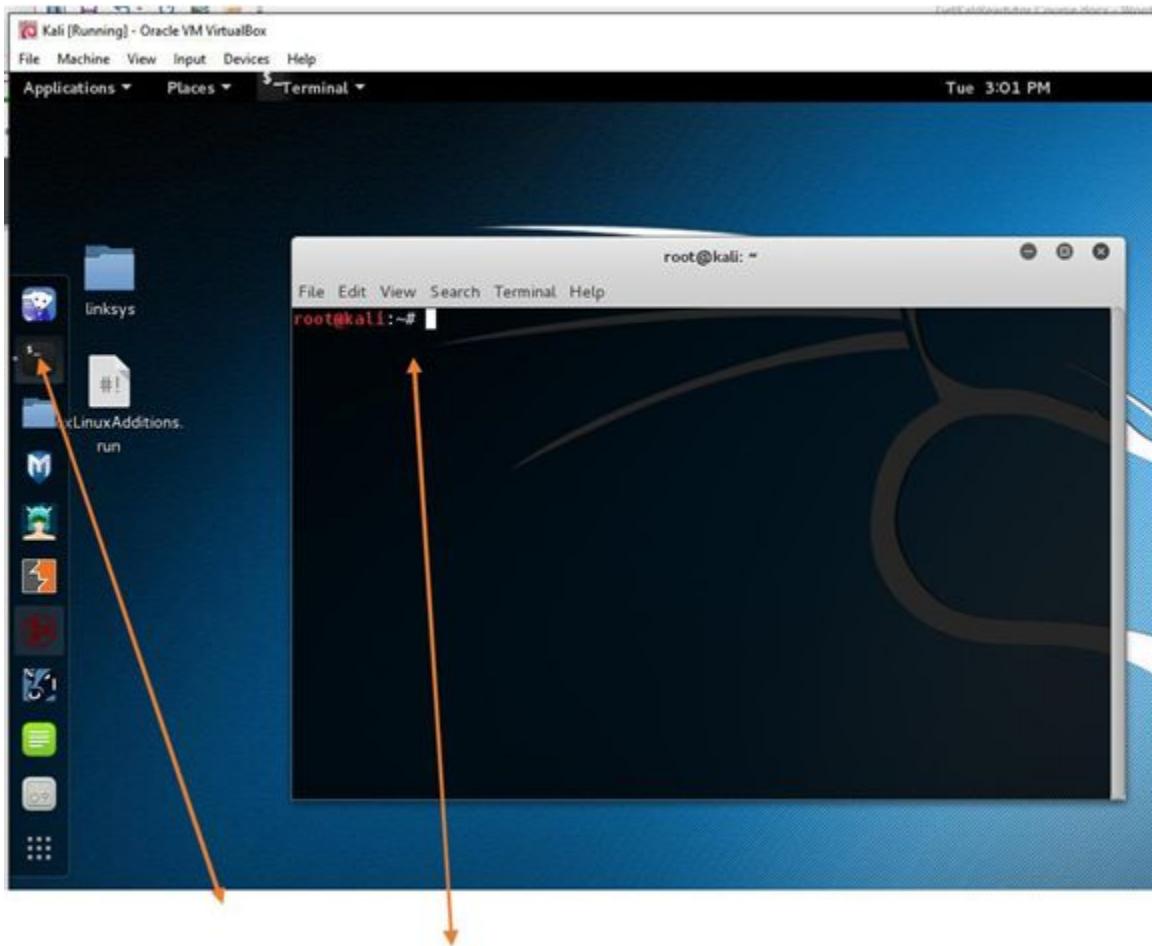
Welcome to KALI in a VM, login as root and use the password you have previously created.



Let the games begin. You have gotten this far; next we will tweak the installation and get ready for updates and other internet functionality.

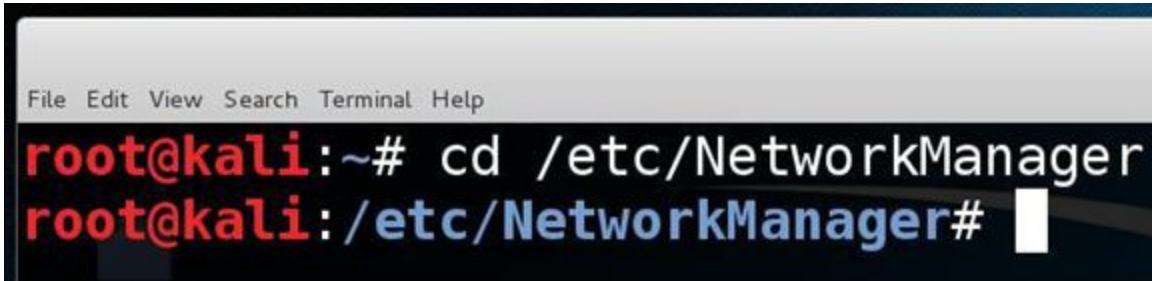
Tweak your Kali VM

There are a few final steps and your Kali VM will be ready to go. Let's go to the "Terminal" and verify and change some settings.



To launch the terminal: press the icon under iceweasel, it looks like a command prompt, and when it opens you see this screen. This is where we are going to verify some settings.

Change the NetworkManager.conf file settings from “false” to “true”.



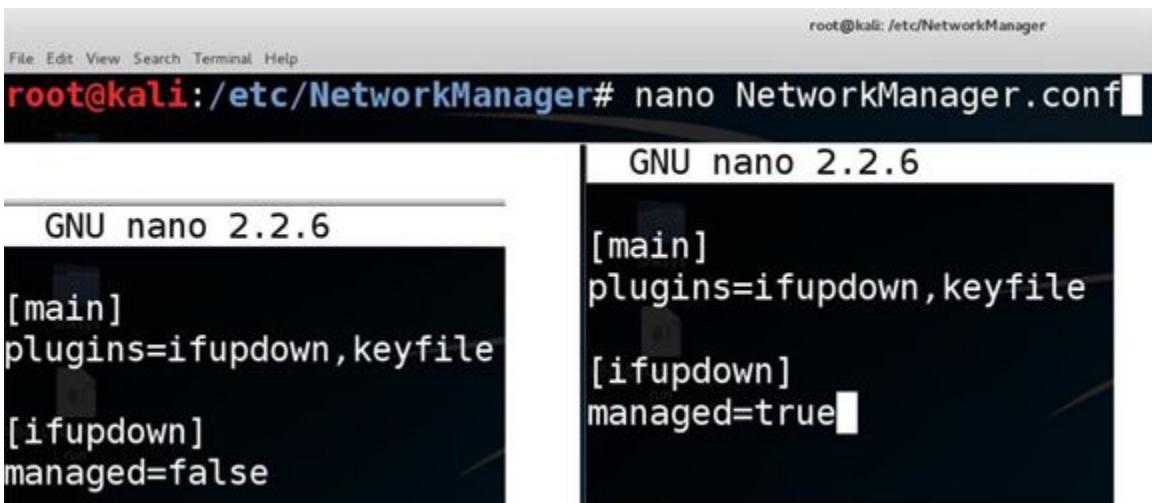
```
File Edit View Search Terminal Help
root@kali:~# cd /etc/NetworkManager
root@kali:/etc/NetworkManager#
```

We want to get to the directory that contains the NetworkManager.conf file - from the prompt, change your directory with cd /etc/NetworkManager (case sensitive) your prompt should change to that directory.



```
File Edit View Search Terminal Help
root@kali:/etc/NetworkManager# ls
conf.d  dispatcher.d  NetworkManager.conf
root@kali:/etc/NetworkManager#
```

Once there type in **ls** and confirm. You will see the “NetworkManager.conf file” (Seen here in white). We then want to edit this file. We are going to use nano (a text editor for this) In the same directory type in nano NetworkManager.conf and press enter (case sensitive)



```
File Edit View Search Terminal Help
root@kali:/etc/NetworkManager# nano NetworkManager.conf
```

GNU nano 2.2.6

```
[main]
plugins=ifupdown,keyfile

[ifupdown]
managed=false
```

GNU nano 2.2.6

```
[main]
plugins=ifupdown,keyfile

[ifupdown]
managed=true
```

Where it says “managed=false” change to “managed=true”. Then hit Ctrl+O and hit enter to save then Ctrl+X to exit the editor and return to the terminal and see if u can ping google.com

Check your source file for the correct repositories for Kali updates and upgrades to the current files can be found here <http://docs.kali.org/general-use/kali-linux-sources-list-repositories>. You need all lines of this to match in your source file to avoid duplicates. I just cleaned mine out and pasted the ones in that link in. Let's check or clean out the file

```
root@kali:~# cd /etc/apt
root@kali:/etc/apt# ls
apt.conf.d      preferences.d  sources.list~
listchanges.conf  sources.list   sources.list.d
root@kali:/etc/apt#
```

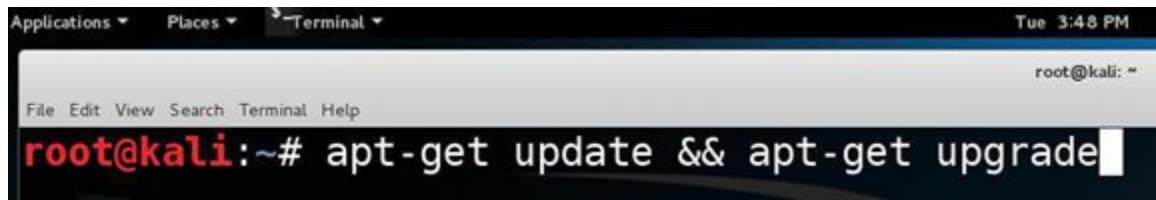
Navigate to cd /etc/apt directory and do an ls to check for the sources.list file again we are going to use nano to check out this file by typing nano sources.list

In this case I took the lines in the link and pasted them into the file and cleaned out the rest. **NOTE: they do change it now and then** so you need to check Kali docs at docs.kali.org

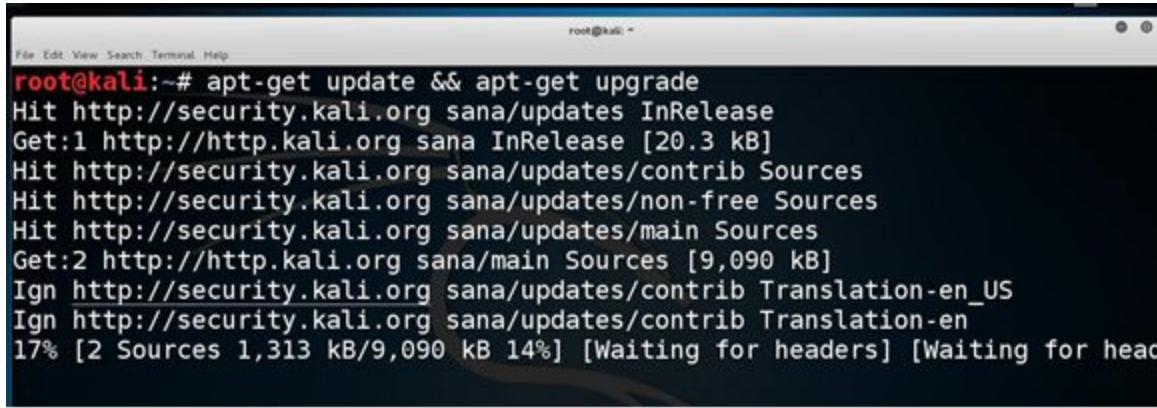


If they match you are good to go, if not cut and paste into your nano session again Ctrl+O and press enter to save and Ctrl+X to exit.

Time to get updates and/or upgrades. Once we have connectivity and repositories in the source file it's time to check for updates.



Type in apt-get update && apt-get upgrade -y (the -y is answering yes to things that want to install without prompting you to answer for each one)



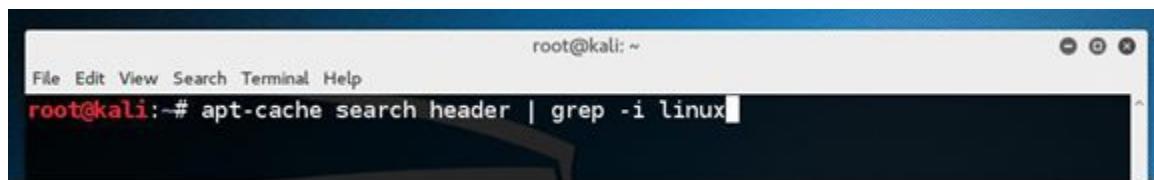
```
root@kali:~# apt-get update && apt-get upgrade
Hit http://security.kali.org sana/updates InRelease
Get:1 http://http.kali.org sana InRelease [20.3 kB]
Hit http://security.kali.org sana/updates/contrib Sources
Hit http://security.kali.org sana/updates/non-free Sources
Hit http://security.kali.org sana/updates/main Sources
Get:2 http://http.kali.org sana/main Sources [9,090 kB]
Ign http://security.kali.org sana/updates/contrib Translation-en_US
Ign http://security.kali.org sana/updates/contrib Translation-en
17% [2 Sources 1,313 kB/9,090 kB 14%] [Waiting for headers] [Waiting for head
```

Once the updates start, be patient big files sometimes look like your system is locked and the first time you do this it can take a while. (You should consider doing this fairly often as there are often updates) When completed, you may see notices, the ones that begin with “W” are only warnings and not a problem. However, if you start seeing ones that begin with “E” and text, read them /check connectivity/check the source file again. With the new rolling updates, you will also want to run **apt-get dist-upgrade** and this can take a while. Reboot Kali and do the **apt-get update && apt-get upgrade -y** again to be sure you have everything.

Install Guest Additions

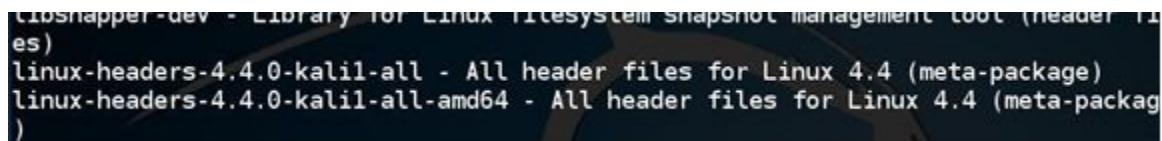
So your VM can use USB devices and other system tools you need to install VBox Guest additions into the Kali VM (Make sure you have updated like above before starting this) There are no optional steps so make sure you can do them successfully before moving on.

To check for linux headers you are looking for the current linux-headers that end in – kali-all-amd64 the version will change over time.

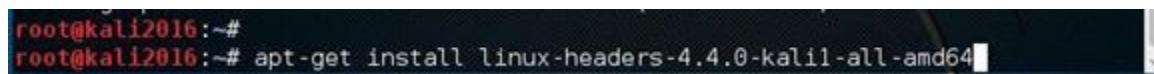


A screenshot of a terminal window titled "root@kali: ~". The window has a standard Linux desktop interface with a title bar and a menu bar. The terminal itself shows the command "root@kali:~# apt-cache search header | grep -i linux" entered by the user. The output of the command is visible below the command line.

This will generate a list (if u updated correctly) when you type in apt-cache search header | grep -i linux look for the one ending in – kali-all-amd64



A screenshot of a terminal window showing the output of the previous command. It lists several packages, with the last two being relevant: "linux-headers-4.4.0-kali1-all" and "linux-headers-4.4.0-kali1-all-amd64". Both are described as "All header files for Linux 4.4 (meta-package)".

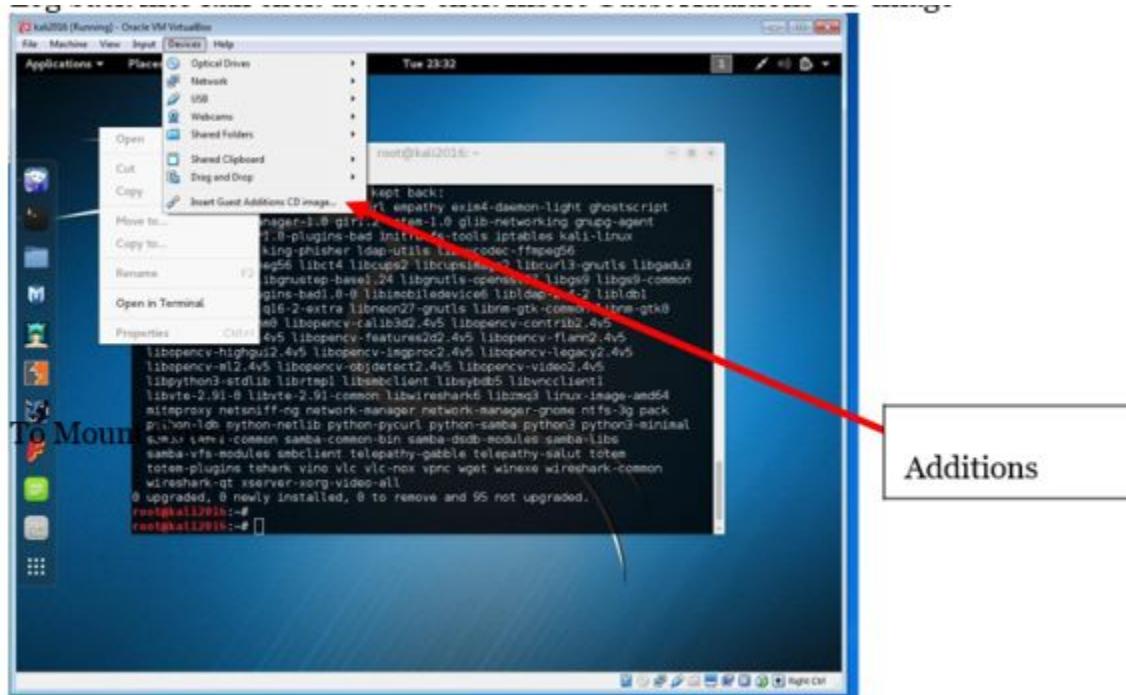


A screenshot of a terminal window titled "root@kali2016:~#". The user has run the command "apt-get install linux-headers-4.4.0-kali1-all-amd64". The terminal is waiting for the user to press enter to start the download and installation process.

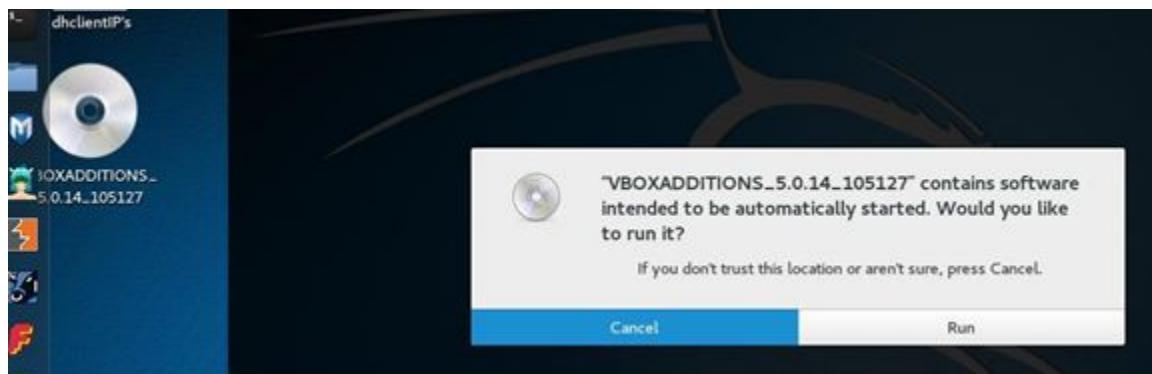
Install Linux headers at the time of writing it went to 4.5 this does change so type in the version you see when you do the apt-cache search header | grep -I linux and install with **apt-get install linux-headers-4.5.0-kali1-all-amd64**

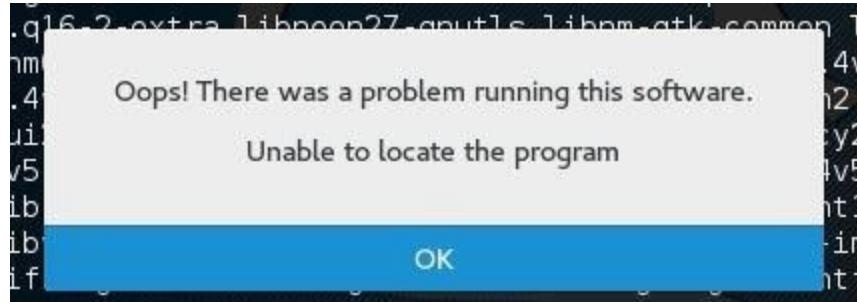
When that finishes (just in case) run **apt-get update && apt-get upgrade -y** (there might be nothing to update but it is good to check) then in the terminal type **reboot**

Log back into kali click devices click Insert Guest Additions CD image.



You should see a graphic of a cd and an option to run and when u click run it will fail.





Just click OK.

Then go back to your terminal navigate to the media you just mounted type in cd /media/cdrom0 then type ls so you can verify the file VBoxLinuxAdditions.run

```
root@kali:~# cd /media/cdrom0
root@kali:/media/cdrom0# ls
32Bit      autorun.sh  runasroot.sh          VBoxWindowsAdditions-amd64.exe
64Bit      cert        VBoxLinuxAdditions.run  VBoxWindowsAdditions.exe
AUTORUN.INF OS2        VBoxSolarisAdditions.pkg VBoxWindowsAdditions-x86.exe
root@kali:/media/cdrom0#
```

You want to copy this file to your desktop in order to get it to run type in cp VBoxLinuxAdditions.run /root/Desktop (you must remember this is case sensitive)

The screenshot shows a Kali Linux desktop environment. On the desktop, there is a file icon for "VBOXADDITIONS_5.0.14_105127.iso". A red arrow points from a callout box labeled "Shows up on Desktop" to this file. To the right of the desktop is a terminal window with the following session:

```
AUTORUN.IRH 032 VBOXSOLARISADDITIONS.pkg VBOXWINDOWSADDITIONS.pkg  
root@kali:/media/cdrom0# cp VBox  
VBoxLinuxAdditions.run VBoxWindowsAdditions.exe  
VBoxSolarisAdditions.pkg VBoxWindowsAdditions-x86.exe  
VBoxWindowsAdditions-amd64.exe  
root@kali:/media/cdrom0# cp VBoxLinuxAdditions.run /root/Desktop  
root@kali:/media/cdrom0#
```

Below the desktop area, another terminal window is open with the following session:

```
File Edit View Search Terminal Help  
root@kali:~/Desktop  
root@kali:~# cd Desktop  
root@kali:~/Desktop# ls  
dhclientIP's linksys VBoxLinuxAdditions.run  
root@kali:~/Desktop#
```

Navigate back to root and type in cd Desktop (remember the caps) then ls to verify you see it. Now run the file by typing ./VBoxLinuxAdditions.run (you can copy & paste)

```
root@kali2016: ~/Desktop
File Edit View Search Terminal Help
root@kali2016:~/Desktop# ls
•VBoxLinuxAdditions.run
root@kali2016:~/Desktop# ./VBoxLinuxAdditions.run
Verifying archive integrity... All good.
Uncompressing VirtualBox 5.0.14 Guest Additions for Linux.....
VirtualBox Guest Additions installer
Copying additional installer modules ...
Installing additional modules ...
Removing existing VirtualBox non-DKMS kernel modules ...done.
Building the VirtualBox Guest Additions kernel modules
The headers for the current running kernel were not found. If the following
module compilation fails then this could be the reason.

Building the main Guest Additions module ...fail!
(Look at /var/log/vboxadd-install.log to find out what went wrong)
Doing non-kernel setup of the Guest Additions ...done.
Installing the Window System drivers
Installing X.Org Server 1.18 modules ...done.
Setting up the Window System to use the Guest Additions ...done.
You may need to restart the the Window System (or just restart the guest system)
to enable the Guest Additions.

Installing graphics libraries and desktop services components ...done.
root@kali2016:~/Desktop#
```

Your Kali VM is ready to use, ENJOY!

Resources

VBOX & Guest Additions <https://www.virtualbox.org/wiki/Downloads> Kali

ISO <https://www.kali.org/downloads/>

TOR Browser <https://www.torproject.org/>

Kali Repository for your source file <http://docs.kali.org/general-use/kali-linux-sources-list-repositories>

Kali Docs <http://docs.kali.org/>

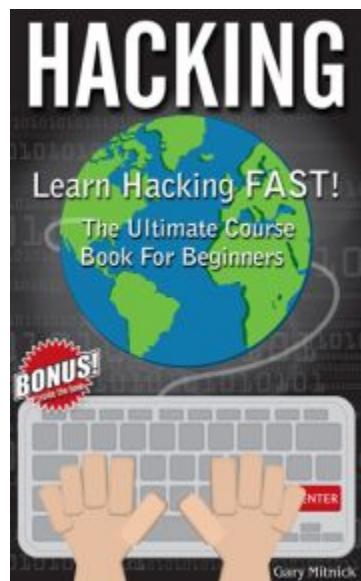
What is the BIOS <https://en.wikipedia.org/wiki/BIOS>

Good to Have:

Home router or a neighbor's permission for you to study them

Old windows pc to attack or VM with Windows (unpatched to see the ugly)

More Course Books



<https://www.amazon.com/dp/B013JB35IK/>



<https://www.amazon.com/dp/B01M15T2GG/>

